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Third Edition

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Foreword

As a professional who has been practicing medicine for over four decades now, I appreciate the value this book brings to the table in times like today. As we move from a largely descriptive era to the bullet-point generation, this academic initiative appears even more relevant than its first two editions.

Many refinements have been made in this book bearing in mind the reception it has received in the last few years. The book has been a reference point for many medical entrance examinations and has left an impact on medical professionals who look for high quality of academic material.

Harrison's Principles of Internal Medicine, published by The McGraw-Hill Companies, Inc. is an epic in the world of medical science. This book serves as a faithful companion to the epic by assisting the readers draw most out of it in the service of mankind.

Knowledge is a more processed form of information. Prof. Ajay Mathur stays true to his pledge by presenting well-digested bytes of knowledge across different fields of medicine. He relies on good old word-of-mouth to make this book a success rather than blitzkrieg marketing. I recommend that you make this a must-have without a shadow of doubt.

Dr Ramesh Roop Rai

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Preface

Medicine, in all its vastness, needs to be understood in a way that makes most sense to how it is applied today. Memorizing each word is elusive and therefore, testing knowledge of a discipline remains an evergreen challenge.

It is a widely accepted fact that taking a quiz soon after studying helps one retain information and knowledge better. The brain works in mysterious ways but a sure way of holding onto what the mind has already digested is to put lessons to test. Multiple Choice Questions are a quick and effective way of remembering the gist of the matter. This is precisely the reason why most examinations today follow this format. This book is committed to hone your skills for retaining knowledge; it is only axiomatic that excellence will follow when you acquire knowledge properly.

In its third edition, this book incorporates the recent advances in medicine as well as my personal insights on how to learn better. Based on earlier and the 18th edition of Harrison's Principles of Internal Medicine, published by The McGraw-Hill Companies, Inc., this book also comprises relevant studies from the leading medical journals from the world over.

This book caters to medical professionals at all levels. Not only can this be used by aspiring doctors to prepare for medical entrance examinations but by seasoned medical professionals to update knowledge long after it has been acquired. The book is sign-posted with resources and references should the reader require elaboration on any given topic.

Over ten thousand questions and still counting; I take it upon myself to continually refine the content of the book and chronicle the advances of medical science.

Dr Ajay Mathur
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Chapter 57. Anemia and Polycythemia

1 According to WHO, anemia is defined as as a hemoglobin level of ?

Harrison's 18th Ed. 449

- A. < 14 g/dL in men & < 13 g/dL in women
- B. < 13 g/dL in men & < 12 g/dL in women
- C. < 12 g/dL in men & < 11 g/dL in women
- D. < 11 g/dL in men & < 10 g/dL in women

The World Health Organization (WHO) defines anemia as a hemoglobin level < 13 g/dL in men and < 12 g/dL in women.

2 Hematopoietic stem cell produce which of the following ?

Harrison's 18th Ed. 448

- A. Red cells
- B. All classes of granulocytes
- C. Cells of the immune system
- D. All of the above

Stem cells are capable of producing red cells, all classes of granulocytes, monocytes, platelets, and the cells of the immune system.

3 In the absence of erythropoietin (EPO), committed erythroid progenitor cells undergo ?

Harrison's 18th Ed. 448

- A. Stunted growth
- B. Halting of growth
- C. Programmed cell death (apoptosis)
- D. Change to other series of hematopoietic cell

For RBC production, EPO is the regulatory hormone. It is required for maintenance of committed erythroid progenitor cells which undergoes programmed cell death (apoptosis) if EPO is absent.

4 How many mature red cells are produced from a pronormoblast ?

Harrison's 18th Ed. 448

- A. 1 to 16
- B. 16 to 32
- C. 32 to 48
- D. 48 to 64

Pronormoblast undergoes 4 - 5 cell divisions resulting in the production of 16 - 32 mature RBC's.

5 Regulation of EPO production is linked to ?

Harrison's 18th Ed. 448

- A. O₂
- B. CO₂
- C. Red cell mass
- D. Hemoglobin concentration

The regulation of EPO production is linked to O₂ availability.

6 Which of the following about mature red cell is false ?

Harrison's 18th Ed. 448

- A. Diameter is 8 µm
- B. Anucleate
- C. Discoid in shape
- D. None of the above

Mature RBC is 8 µ in diameter, anucleate, discoid in shape, and extremely pliable for it to negotiate microcirculation successfully.

7 What percentage of all circulating RBC's is replaced daily ?

Harrison's 18th Ed. 448

- A. 0.2 to 0.4 %
- B. 0.4 to 0.6 %
- C. 0.6 to 0.8 %
- D. 0.8 to 1%

Since the average red cell lives for 100 - 120 days, normal red cell production results in the daily replacement of 0.8 - 1% of all circulating red cells in the body,

8 Term "erythron" best relates to ?

Harrison's 18th Ed. 448

- A. Erythroid / megakaryocyte progenitor
- B. Red cell destruction
- C. Organ responsible for red cell production
- D. Red blood cell mass

The organ responsible for red cell production is called "erythron" which consists of a rapidly proliferating pool of marrow erythroid precursor cells & the mass of mature circulating RBCs.

9 Erythropoietin is a ?

Harrison's 18th Ed. 448

- A. Peptide hormone
- B. Glycoprotein hormone
- C. Steroid hormone
- D. None of the above

EPO is a glycoprotein hormone that acts by binding to specific receptors on surface of marrow erythroid precursors, inducing them to proliferate & mature when iron is adequately available.

10 Erythropoietin is produced and released by ?

Harrison's 18th Ed. 448

- A. Glomerular capillaries
- B. Proximal tubular cells
- C. Peritubular capillary lining cells of kidney
- D. All of the above

Physiologic regulator of RBC production, glycoprotein hormone EPO, is produced & released by highly specialized epithelial-like peritubular capillary lining cells within kidney.

11 Erythropoietin is also produced by ?

Harrison's 18th Ed. 448

- A. Pancreas
- B. Spleen
- C. Hepatocytes
- D. All of the above

A small amount of EPO is produced by hepatocytes.

12 Key to EPO gene regulation is ?

Harrison's 18th Ed. 448

- A. (HIF)-1
- B. (EIF)-1
- C. (RIF)-1
- D. (GIF)-1

Key to EPO gene regulation is hypoxia-inducible factor (HIF)-1.

13 EPO production is increased in ?

Harrison's 18th Ed. 448

- A. Anemia

- B. Hypoxemia
- C. Renal artery stenosis
- D. All of the above

The fundamental stimulus for EPO production is the availability of O_2 for tissue metabolic needs. Anemia, hypoxemia, or renal artery stenosis can raise EPO production.

14 Normal level of Plasma EPO is ?

Harrison's 18th Ed. 448

- A. 10 to 25 U/L
- B. 25 to 50 U/L
- C. 50 to 75 U/L
- D. 75 to 100 U/L

Normal EPO level in plasma is 10 - 25 U/L.

15 Plasma EPO levels increase when hemoglobin falls below ?

Harrison's 18th Ed. 449 Figure 57-2

- A. 10 to 12 g/dL
- B. 8 to 10 g/dL
- C. 6 to 8 g/dL
- D. 4 to 6 g/dL

When the hemoglobin level falls to 12 g/dL, plasma EPO levels increase logarithmically. When hemoglobin concentration falls below 10 - 12 g/dL, plasma EPO levels increase in proportion to the severity of anemia.

16 In circulation, EPO has a half-clearance time of ?

Harrison's 18th Ed. 448

- A. 1 to 3 hours
- B. 3 to 6 hours
- C. 6 to 9 hours
- D. 9 to 12 hours

In circulation, EPO has a half-clearance time of 6 - 9 hours.

17 The mean hematocrit value for adult males is ?

Harrison's 18th Ed. 448

- A. 42 %
- B. 45 %
- C. 47 %
- D. 49 %

Mean hematocrit value for adult males is 47% ($\pm$ SD 7) and for adult females is 42% ($\pm$ 5).

18 Anemia is most often recognized by ?

Harrison's 18th Ed. 449

- A. Attendant symptoms
- B. Attendant signs
- C. Abnormal screening laboratory tests
- D. All of the above

Anemia is most often recognized by (incidental) abnormal screening laboratory tests.

19 O_2 -hemoglobin dissociation curve relates to which of the following ?

Harrison's 18th Ed. 449

- A. Claude effect
- B. Bohr effect
- C. Charles effect

- D. Bennet effect

Bohr effect refers to enhanced O_2 delivery through changes in O_2 -hemoglobin dissociation curve mediated by a decreased pH or increased CO_2 .

20 Signs of vascular instability appear with acute blood loss of ?

Harrison's 18th Ed. 449

- A. 5 to 10 % of total blood volume
- B. 10 to 15 % of total blood volume
- C. 15 to 20 % of total blood volume
- D. 20 to 25% of total blood volume

Signs of vascular instability appear with acute losses of 10 - 15% of the total blood volume.

21 Hypovolemic shock results if volume of blood lost is ?

Harrison's 18th Ed. 449

- A. > 25 %
- B. > 30 %
- C. > 35 %
- D. > 40 %

If the volume of blood lost is >40% (>2 L in average-sized adult), signs of hypovolemic shock including confusion, dyspnea, diaphoresis, hypotension and tachycardia appear.

22 Intravascular hemolysis with release of free hemoglobin may be associated with ?

Harrison's 18th Ed. 449

- A. Acute back pain
- B. Acute pain in lower limbs
- C. Acute pain in upper limbs
- D. Acute headache

Intravascular hemolysis with release of free hemoglobin may be associated with acute back pain, free hemoglobin in the plasma and urine, and renal failure.

23 Which of the following may be associated with autoimmune hemolysis ?

Harrison's 18th Ed. 449

- A. Chronic lymphocytic leukemia
- B. Infection
- C. Rheumatoid arthritis
- D. All of the above

Chronic inflammatory states (infection, rheumatoid arthritis, cancer) are associated with mild to moderate anemia, whereas lymphoproliferative disorders (chronic lymphocytic leukemia and certain other B cell neoplasms) may be associated with autoimmune hemolysis.

24 If palmar creases are lighter in color than surrounding skin, hemoglobin level is usually ?

Harrison's 18th Ed. 449

- A. < 10 g/dL
- B. < 8 g/dL
- C. < 6 g/dL
- D. < 4 g/dL

If the palmar creases are lighter in color than the surrounding skin with hyperextended hand, the hemoglobin level is usually < 8 g/dL.

25 Femtoliters is the unit of expression of which of the following ?

Harrison's 18th Ed. 449

- A. Mean cell volume (MCV)

- B. Mean cell hemoglobin (MCH)
- C. Mean concentration of Hb per volume of RBCs (MCHC)
- D. None of the above

Mean cell volume (MCV) - femtoliters, mean cell hemoglobin (MCH) - picograms per cell, and mean concentration of hemoglobin per volume of red cells (MCHC) - grams per liter.

26 Which of the following reflects iron supply ?

Harrison's 18th Ed. 450

- A. Serum iron
- B. Total iron-binding capacity (TIBC)
- C. Serum ferritin
- D. All of the above

Serum iron, total iron-binding capacity (TIBC), and serum ferritin are measurements of iron supply.

27 Which of the following formula estimates MCV ?

Harrison's 18th Ed. 450 Table 57-2

- A. $(\text{Hematocrit} \times 10) / (\text{red cell count} \times 10^6)$
- B. $(\text{Hemoglobin} \times 10) / (\text{red cell count} \times 10^6)$
- C. $(\text{Hemoglobin} \times 10) / \text{hematocrit}$
- D. $(\text{Hematocrit} \times 10) / \text{hemoglobin}$

28 Anisocytosis is related to which feature of RBC ?

Harrison's 18th Ed. 450

- A. Size
- B. Shape
- C. Number
- D. Colour

Variations in red cell size is called anisocytosis.

29 Poikilocytosis is related to which feature of RBC ?

Harrison's 18th Ed. 450

- A. Size
- B. Shape
- C. Number
- D. Colour

Variations in red cell shape is called poikilocytosis. Poikilocytosis suggests a defect in the maturation of red cell precursors in bone marrow or fragmentation of circulating red cells.

30 RDW correlates with ?

Harrison's 18th Ed. 450

- A. Anisocytosis
- B. Poikilocytosis
- C. Polychromasia
- D. All of the above

Degree of anisocytosis correlates with increases in RDW or the range of cell sizes.

31 Upon staining with supravital dye, reticulocytes are identified by what colour of punctate spots ?

Harrison's 18th Ed. 450

- A. Red
- B. Blue
- C. Green
- D. Yellow

Reticulocytes are larger red cells, grayish blue in color on Wright-Giemsa stain, that are recently released from bone marrow & their color represents residual amounts of ribosomal RNA.

32 Reliable estimate of red cell production is provided by ?

Harrison's 18th Ed. 452

- A. EPO levels
- B. Reticulocyte count
- C. RDW
- D. Polychromasia

Reticulocyte count provides a reliable measure of red cell production.

33 "Shift" cells refer to ?

Harrison's 18th Ed. 453

- A. Older RBC's
- B. Prematurely released reticulocytes
- C. Normoblasts
- D. Any of the above

In anemia, polychromatophilic macrocytes in PBF represent prematurely released reticulocytes referred to as "shift" cells.

34 Erythroid cells take about how many days to mature ?

Harrison's 17th Ed. 359 Figure 58-13

- A. 2.5
- B. 3.5
- C. 4.5
- D. 5.5

Erythroid cells take ~4.5 days to mature. At normal hematocrit levels, they are released to the circulation with ~1 day left as reticulocytes.

35 Absolute reticulocyte count is calculated by ?

Harrison's 18th Ed. 452 Table 57-4

- A. $\text{Reticulocyte count} \times (\text{Hemoglobin} \div \text{expected hemoglobin})$
- B. $\text{Reticulocyte count} \times (\text{Hemoglobin} + \text{Hematocrit})$
- C. $\text{Reticulocyte count} \times (\text{Hemoglobin} \times \text{Hematocrit})$
- D. $\text{Reticulocyte count} / (\text{Hemoglobin} + \text{Hematocrit})$

36 Which of the following about macrocytes is false ?

Harrison's 18th Ed. 451 Figure 57-5

- A. Red cells are larger than a small lymphocyte
- B. Well hemoglobinized red cells
- C. Often oval shaped
- D. None of the above

Macrocytes are red blood cells that are larger than a small lymphocyte and are well hemoglobinized. Often macrocytes are oval shaped (macro-ovalocytes).

37 Howell-Jolly bodies best relate to which of the following ?

Harrison's 18th Ed. 451 Figure 57-6

- A. Uremia
- B. Nuclear remnants
- C. Foreign bodies in the circulation
- D. All of the above

Howell-Jolly bodies refer to tiny nuclear remnants that are not removed from red cells due to absence of a functional spleen (splenectomy) and with maturation/dysplastic disorders (excess production). They remain as small homogeneously staining blue inclusions on Wright stain.

38 Teardrop-shaped red cells best relates to ?

Harrison's 18th Ed. 451 Figure 57-7

- A. Uremia
- B. Myelofibrosis

- C. Thalassemia
- D. Liver disease

Teardrop-shaped red cells are seen in myelofibrosis and extramedullary hematopoiesis.

39 Target red cells best relates to ?

Harrison's 18th Ed. 451 Figure 57-8

- A. Uremia
- B. Myelofibrosis
- C. Thalassemia
- D. Acute hemolysis

Target red cells have a bull's-eye appearance & are seen in thalassemia and liver disease.

40 Target cells are seen in ?

Harrison's 18th Ed. 451 Figure e17-13

- A. Liver disease
- B. Thalassemia
- C. Hemoglobin C disease
- D. All of the above

Target cells are recognized by the bull's-eye appearance of the red cell. Small numbers of target cells are seen with liver disease & thalassemia. Larger numbers are typical of hemoglobin C disease.

41 Thermal injury may produce which of the following ?

Harrison's 18th Ed. 451 Figure 57-9

- A. Target cells
- B. Burr cells
- C. Howell-Jolly bodies
- D. Red cell fragmentation

Presence of foreign bodies in the circulation (mechanical heart valves), or thermal injury may cause red cell fragmentation.

42 Burr cells are also called ?

Harrison's 18th Ed. 451 Figure 57-10

- A. Echinocytes
- B. Acanthocytes
- C. Elliptocytes
- D. Spherocytes

Burr cells are also called echinocytes. Echinocytes have small, uniform, and evenly spaced membrane projections.

43 Echinocytes are found in patients with ?

Harrison's 18th Ed. 451 Figure e17-16

- A. Severe uremia
- B. Glycolytic red cell enzyme defects
- C. Microangiopathic hemolytic anemia
- D. All of the above

Echinocytes are found in patients with severe uremia, in glycolytic red cell enzyme defects, and in microangiopathic hemolytic anemia.

44 Acanthocytes are present in which of the following conditions ?

Harrison's 18th Ed. 451 Figure e17-16

- A. Severe liver disease
- B. Abetalipoproteinemia
- C. Patients with McLeod blood group
- D. All of the above

Acanthocytes are contracted dense cells with irregular membrane projections that vary in length and width. Acanthocytes are present in severe liver disease, in patients with abetalipoproteinemia, and in rare patients with McLeod blood group.

45 The normal serum iron range is ?

Harrison's 18th Ed. 453

- A. 10 to 50 µg / dL
- B. 50 to 150 µg / dL
- C. 150 to 250 µg / dL
- D. 250 to 450 µg / dL

Normal serum iron ranges from 50 - 150 µg/dL

46 The normal serum TIBC range is ?

Harrison's 18th Ed. 453

- A. 100 to 150 µg / dL
- B. 150 to 300 µg / dL
- C. 300 to 360 µg / dL
- D. 350 to 450 µg / dL

Normal TIBC is 300 - 360 µg/dL.

47 Percent transferrin saturation is calculated by ?

Harrison's 18th Ed. 453

- A. $(TIBC \times 100) \div \text{Serum iron}$
- B. $(\text{Serum iron} + TIBC) \div 100$
- C. $(\text{Serum iron} \times 100) \div TIBC$
- D. $(\text{Serum iron} \div TIBC) \times 100$

Percent transferrin saturation is derived by dividing serum iron level (x 100) by TIBC. Normal transferrin saturation ranges from 25 - 50%.

48 Adult males have average serum ferritin levels of about ?

Harrison's 18th Ed. 453

- A. 10 µg / L
- B. 50 µg / L
- C. 100 µg / L
- D. 200 µg / L

Serum ferritin is used to evaluate total-body iron stores. Adult males have serum ferritin levels that average ~100 µg/L, corresponding to iron stores of ~1 gram. Serum ferritin level of 10 - 15 µg/L represents depletion of body iron stores.

49 Adult females have average serum ferritin levels of about ?

Harrison's 18th Ed. 453

- A. 10 µg / L
- B. 30 µg / L
- C. 60 µg / L
- D. 90 µg / L

Adult females have serum ferritin levels averaging 30 µg/L, reflecting lower iron stores (300 mg).

50 Ferritin is also an ?

Harrison's 18th Ed. 453

- A. Enzyme
- B. Cytokine
- C. Chemokine
- D. Acute-phase reactant

Ferritin is also an acute-phase reactant.

- 51 Erythroblasts containing what are called sideroblasts ?**
Harrison's 18th Ed. 454

 - A Hemosiderin
 - B Ferritin
 - C Residual RNA
 - D All of the above

In bone marrow smears, developing erythroblasts with small ferritin granules are sideroblasts.
- 52 Hemolysis is most likely cause if reticulocyte production index is more than ?**
Harrison's 18th Ed. 454

 - A 2.5
 - B 3.5
 - C 4.5
 - D 5.5

Reticulocyte production index of >2.5 indicates that hemolysis is most likely.
- 53 Which of the following anemias is most frequent ?**
Harrison's 18th Ed. 455

 - A Hypoproliferative
 - B Maturation Disorders
 - C Hemoglobinopathies
 - D Hemolytic

At least 75% of all cases of anemia are hypoproliferative in nature. Hemolytic disease is among the least common forms of anemia.
- 54 A hypoproliferative anemia can result from ?**
Harrison's 18th Ed. 455

 - A Marrow damage
 - B Iron deficiency
 - C Inadequate EPO stimulation
 - D All of the above

Majority of hypoproliferative anemias are due to mild to moderate iron deficiency or inflammation. They result from marrow damage, iron deficiency or inadequate EPO stimulation.
- 55 Which of the following is the iron regulatory hormone ?**
Harrison's 18th Ed. 455

 - A Erythropoietin
 - B Transferrin
 - C Hepcidin
 - D All of the above

Hepcidin is the iron regulatory hormone that is increased in inflammation.
- 56 Nuclear maturation defects of RBC's result from all except ?**
Harrison's 18th Ed. 455

 - A Vitamin B₁₂ deficiency
 - B Folic acid deficiency
 - C Iron deficiency
 - D Methotrexate therapy

Nuclear maturation defects result from vitamin B₁₂ or folic acid deficiency, drug damage (methotrexate or alkylating agents), myelodysplasia and alcohol.
- 57 Cytoplasmic maturation defects of RBC's result from ?**
Harrison's 18th Ed. 455

 - A Severe iron deficiency

- B Abnormalities in heme synthesis
- C Abnormalities in globin synthesis
- D Any of the above

Cytoplasmic maturation defects result from 'severe' iron deficiency or abnormalities in globin or heme synthesis.

- 58 Increased red cell mass is present when hematocrit in men is ?**
Harrison's 18th Ed. 456

 - A > 45 %
 - B > 50 %
 - C > 55 %
 - D > 60 %

PCV >60% in men & >55% in women are invariably associated with an increased red cell mass.

- 59 Gaisbock's syndrome relates to ?**
Harrison's 18th Ed. 456

 - A Spurious polycythemia
 - B High altitude polycythemia
 - C Ectopic EPO production
 - D Familial polycythemia

Gaisbock's syndrome refers to spurious polycythemia due to a decrease in plasma volume.

- 60 EPO-producing neoplasms include ?**
Harrison's 18th Ed. 457

 - A Hepatoma
 - B Uterine leiomyoma
 - C Cerebellar hemangiomas
 - D All of the above

EPO-producing neoplasms include hepatoma, uterine leiomyoma, renal cancer or cysts and cerebellar hemangiomas.

Chapter 58. Bleeding and Thrombosis

- 61 In the human hemostatic system, procoagulant forces include ?**
Harrison's 18th Ed. 457

 - A Platelet adhesion
 - B Platelet aggregation
 - C Fibrin clot formation
 - D All of the above

In the human hemostatic system, procoagulant forces include platelet adhesion and aggregation and fibrin clot formation.

- 62 The major components of the hemostatic system are ?**
Harrison's 18th Ed. 457

 - A Platelets, monocytes and red cells
 - B Plasma proteins
 - C Vessel wall
 - D All of the above

Major components of the hemostatic system platelets & other formed elements of blood (monocytes & RBCs), plasma proteins (coagulation & fibrinolytic factors & inhibitors) and vessel wall.

63 Formed element of blood that is not a component of the hemostatic system is ?

Harrison's 18th Ed. 457

- A. Neutrophil
- B. Monocyte
- C. Red cell
- D. Platelet

Major components of hemostatic system are platelets, monocytes & red cells, plasma proteins (coagulation & fibrinolytic factors & inhibitors) and vessel wall itself.

64 Platelet adhesion is mediated primarily by ?

Harrison's 18th Ed. 457

- A. von Willebrand factor (vWF)
- B. Gp IIb/IIIa
- C. Gp Ia/IIa
- D. Fibronection

Platelet adhesion is mediated primarily by von Willebrand factor (vWF).

65 Which of the following is false about von Willebrand factor (VWF) ?

Harrison's 18th Ed. 457

- A. Large multimeric protein
- B. Present in plasma
- C. Present in extracellular matrix of subendothelial vessel wall
- D. None of the above

von Willebrand factor (VWF) is a large multimeric protein present in both plasma & extracellular matrix of subendothelial vessel wall. It serves as the primary "molecular glue" to withstand high levels of shear stress that would detach platelets due to flow of blood.

66 Which of the following is released from activated platelets ?

Harrison's 18th Ed. 457

- A. Epinephrine
- B. Thrombin
- C. Adenosine diphosphate
- D. All of the above

Platelet adhesion is followed by platelet activation and aggregation which is enhanced & amplified by humoral mediators in plasma (epinephrine, thrombin), mediators released from activated platelets (adenosine diphosphate, serotonin) & vessel wall extracellular matrix constituents that come in contact with adherent platelets (collagen, VWF).

67 Most abundant receptor on the platelet surface is ?

Harrison's 18th Ed. 457

- A. Gp Ia/IIa
- B. Gp Ib/IX
- C. Gp IIb/IIIa
- D. Gp VI

Platelet glycoprotein (Gp) IIb/IIIa ($\alpha_{IIb}\beta_3$) complex is the most abundant receptor on platelet surface.

68 Platelet surface receptor GpIIb / IIIa binds to ?

Harrison's 18th Ed. 457

- A. Thrombospondin
- B. Fibrinogen
- C. Collagen
- D. All of the above

Platelet activation converts the normally inactive GpIIb/IIIa receptor into an active receptor enabling its binding to fibrinogen and vWF.

69 Surface of each platelet has how many GpIIb / IIIa binding sites ?

Harrison's 18th Ed. 457

- A. ~ 10,000
- B. ~ 25,000
- C. ~ 50,000
- D. ~ 100,000

Surface of each platelet has ~50,000 GpIIb/IIIa binding sites.

70 Tissue factor (TF) is present on ?

Harrison's 18th Ed. 458

- A. Subendothelial cellular components of vessel wall
- B. Circulating microparticles from monocytes
- C. Circulating microparticles from platelets
- D. All of the above

TF is expressed on surfaces of subendothelial cellular components of vessel wall (smooth-muscle cells & fibroblasts). TF is present in circulating microparticles shed from monocytes & platelets.

71 Which of the following is a serine protease factor ?

Harrison's 18th Ed. 458

- A. III
- B. VIIa
- C. IX
- D. X

TF binds serine protease factor VIIa and their complex (TF+VIIa) activates factor X to factor Xa. Factor IXa also activates factor X to factor Xa.

72 Essential cofactor for conversion of prothrombin to thrombin is ?

Harrison's 18th Ed. 458

- A. Va
- B. VIIa
- C. IX
- D. X

Factor Xa converts prothrombin to thrombin, the pivotal protease of the coagulation system. The essential cofactor for this reaction is factor Va. Factor Va is produced by thrombin-induced limited proteolysis of factor V.

73 Which of the following in endothelial cells has antithrombotic effect ?

Harrison's 18th Ed. 458

- A. Prostacyclin
- B. Nitric oxide
- C. EctoADPase/CD39
- D. All of the above

Prostacyclin, nitric oxide & ectoADPase/CD39 produced from endothelial cells act to inhibit platelet binding, secretion and aggregation.

74 Anticoagulant factor produced by endothelial cells is ?

Harrison's 18th Ed. 458

- A. Heparan proteoglycans
- B. Antithrombin
- C. Thrombomodulin
- D. All of the above

Endothelial cells produce anticoagulant factors like heparan proteoglycans, antithrombin, TF pathway inhibitor and thrombomodulin.

75 Which of the following produced by endothelial cells acts as an anticoagulant ?

Harrison's 18th Ed. 458

- A. Plasminogen activator inhibitor
- B. Thrombomodulin
- C. Prostacyclin
- D. Nitric oxide

76 Endothelial cells activate fibrinolytic mechanisms through the production of ?

Harrison's 18th Ed. 458-9

- A. Tissue plasminogen activator 1
- B. Urokinase
- C. Plasminogen activator inhibitor
- D. All of the above

Endothelial cells activate fibrinolytic mechanisms through the production of tissue plasminogen activator 1, urokinase, plasminogen activator inhibitor & annexin-2.

77 Which of the following best relates to heparin ?

Harrison's 18th Ed. 459

- A. Antithrombin III
- B. Protein C
- C. Protein S
- D. All of the above

Antithrombin III inhibits thrombin by forming inactivating complexes that increase several folds in the presence of heparin.

78 Which of the following becomes an anticoagulant when it is activated by thrombin ?

Harrison's 18th Ed. 459

- A. Antithrombin III
- B. Protein C
- C. Protein S
- D. Tissue factor pathway inhibitor (TFPI)

Protein C is a plasma glycoprotein that becomes an anticoagulant when activated by thrombin.

79 Which of the following about thrombomodulin is false ?

Harrison's 18th Ed. 458-9

- A. Transmembrane proteoglycan binding site for thrombin on endothelial cell surface
- B. Thrombin-induced activation of protein C occurs physiologically on thrombomodulin
- C. Anticoagulant factor from endothelial cell
- D. None of the above

Thrombomodulin expressed on the surface of endothelial cells binds thrombin at low concentrations and inhibits coagulation through activation of the protein C pathway, leading to enhanced catabolism of clotting factors Va and VIIIa, thereby combating thrombus formation.

80 Activated protein C acts as an anticoagulant by cleaving and inactivating activated factor ?

Harrison's 18th Ed. 459

- A. II
- B. V
- C. VI
- D. X

Activated protein C acts as an anticoagulant by cleaving & inactivating activated factors V & VIII.

81 Which of the following relates to protein S ?

Harrison's 18th Ed. 459

- A. Cofactor
- B. Glycoprotein
- C. Vitamin K dependent posttranslational modification
- D. All of the above

Glycoprotein Protein S is a cofactor that undergoes vitamin K dependent posttranslational modification. It accelerates the reaction of activated protein C with factors V and VIII.

82 Which of the following inhibits TF / FVIIa / FXa complex ?

Harrison's 18th Ed. 459

- A. Activated protein C
- B. Protein S
- C. Tissue factor pathway inhibitor (TFPI)
- D. All of the above

Tissue factor pathway inhibitor (TFPI) is a plasma protease inhibitor that regulates the TF-induced extrinsic pathway of coagulation. TFPI inhibits the TF/FVIIa/FXa complex.

83 Tissue factor pathway inhibitor (TFPI) be released by ?

Harrison's 18th Ed. 459

- A. Heparin
- B. Streptokinase
- C. Urokinase
- D. All of the above

TFPI is bound to lipoprotein and can also be released by heparin from endothelial cells, where it is bound to glycosaminoglycans, and from platelets.

84 Plasminogen activators (tPA & uPA) cleave which bond of plasminogen to generate the active enzyme plasmin ?

Harrison's 18th Ed. 459

- A. Arg460 - Val461
- B. Arg560 - Val561
- C. Arg660 - Val661
- D. Arg760 - Val761

Plasminogen activators (tissue type plasminogen activator & urokinase type plasminogen activator) cleave Arg560-Val561 bond of plasminogen to generate the active enzyme plasmin which is the major protease enzyme of the fibrinolytic system, acting to digest fibrin to fibrin degradation products.

85 "Fibrin specific" activity of plasmin is due to its ?

Harrison's 18th Ed. 459

- A. Arginine-binding sites
- B. Lysine-binding sites
- C. Valine-binding sites
- D. Leucine-binding sites

The lysine-binding sites of plasmin (and plasminogen) permit it to bind specifically to fibrin and therefore physiologic fibrinolysis is "fibrin specific".

86 Physiologic regulation of fibrinolysis is done by ?

Harrison's 18th Ed. 460

- A. Plasminogen activator inhibitors (PAI-1 & PAI-2)
- B. Thrombin-activatable fibrinolysis inhibitor (TAFI)
- C. α_2 -antiplasmin
- D. All of the above

87 Which of the following antiplasmin inhibits plasmin ?

Harrison's 18th Ed. 460

- A. α_1 antiplasmin

- B. α_2 antiplasmin
- C. α_3 antiplasmin
- D. α_4 antiplasmin

PAI1 is the primary inhibitor of tPA & uPA and α_2 antiplasmin is the main inhibitor of plasmin in human plasma, inactivating any nonfibrin clot associated plasmin.

88 Epistaxis is the most common symptom in ?

Harrison's 18th Ed. 460

- A. Hemophilia A
- B. Ehlers-Danlos syndrome
- C. Hereditary hemorrhagic telangiectasia
- D. Cushing's syndrome

Epistaxis is the most common symptom in hereditary hemorrhagic telangiectasia & in boys with VWD.

89 Menorrhagia is a common symptom in women with ?

Harrison's 18th Ed. 460

- A. VWD
- B. Factor XI deficiency
- C. Symptomatic carriers of hemophilia A
- D. All of the above

Menorrhagia is a common symptom in women with underlying bleeding disorders. It is seen in majority of women with VWD & factor XI deficiency & in symptomatic carriers of hemophilia A.

90 Which of the following is called a "life-threatening site of bleeding" ?

Harrison's 18th Ed. 461

- A. Bleeding into oropharynx
- B. Bleeding into central nervous system
- C. Bleeding into retroperitoneum
- D. All of the above

Life-threatening sites of bleeding include bleeding into oropharynx, into central nervous system, and into retroperitoneum.

91 Which of the following about clopidogrel is false ?

Harrison's 18th Ed. 461

- A. Thienopyridine
- B. Inhibits ADP-mediated platelet aggregation
- C. Can precipitate or exacerbate bleeding symptoms
- D. None of the above

Thienopyridines (clopidogrel and prasugrel) inhibit ADP-mediated platelet aggregation and like NSAIDs can precipitate or exacerbate bleeding symptoms.

92 Herb with potential anti-platelet activity is ?

Harrison's 18th Ed. 461 Table 58-2

- A. Ginger
- B. Turmeric
- C. Garlic
- D. All of the above

Herbs with potential anti-platelet activity include Ginkgo, Garlic, Bilberry, Ginger, Dong quai, Feverfew, Asian, Siberian & American ginseng, Turmeric, Meadowsweet and Willow.

93 Which of the following is a Coumarin containing herb ?

Harrison's 18th Ed. 461 Table 58-2

- A. Motherwort
- B. Chamomile

- C. Horse chestnut
- D. All of the above

Coumarin containing herbs include Motherwort (*Leonurus cardiaca*), Chamomile (*Matricaria recutita*, *Chamaemelum mobile*), Horse chestnut (*Aesculus hippocastanum*) Red clover (*Trifolium pratense*) Fenugreek (*Trigonella foenum-graecum*).

94 Bruising or mucosal bleeding may be the presenting complaint in ?

Harrison's 18th Ed. 461

- A. Liver disease
- B. Severe renal impairment,
- C. Hypothyroidism
- D. All of the above

Bruising or mucosal bleeding may be the presenting complaint in liver disease, severe renal impairment, hypothyroidism, paraproteinemias or amyloidosis & bone marrow failure.

95 All coagulation factors are synthesized in ?

Harrison's 18th Ed. 461

- A. Liver
- B. Kidney
- C. Lungs
- D. None of the above

All coagulation factors are synthesized in liver & hepatic failure results in combined factor deficiencies.

96 Which of the following coagulation factors is dependent on vitamin K for posttranslational modification ?

Harrison's 18th Ed. 461

- A. Factor II
- B. Factor VII
- C. Factor IX
- D. All of the above

97 Which of the following proteins is dependent on vitamin K for posttranslational modification ?

Harrison's 18th Ed. 461

- A. Protein C
- B. Protein S
- C. Protein Z
- D. All of the above

Coagulation factors II, VII, IX, X and proteins C, S, and Z are dependent on vitamin K for posttranslational modification.

98 Normal blood platelet count is ?

Harrison's 18th Ed. 461

- A. 50,000 to 100,000/ μ L
- B. 100,000 to 250,000/ μ L
- C. 150,000 to 450,000/ μ L
- D. 250,000 to 550,000/ μ L

Normal blood platelet count is 150,000 to 450,000/ μ L.

99 Thrombocytopenia results from ?

Harrison's 18th Ed. 461

- A. Decreased production of platelets
- B. Increased destruction of platelets
- C. Sequestration of platelets

D. Any of the above

Thrombocytopenia results from decreased production, increased destruction, &/or sequestration.

100 Bleeding rarely occurs in isolated thrombocytopenia at counts ?

Harrison's 18th Ed. 461

- A. < 50000 / μ L
- B. < 80000 / μ L
- C. < 100000 / μ L
- D. < 150000 / μ L

Bleeding rarely occurs in isolated thrombocytopenia at counts < 50000 / μ L.

101 Most procedures can be performed in patients with a platelet count of ?

Harrison's 18th Ed. 461

- A. < 50000 / μ L
- B. < 80000 / μ L
- C. < 100000 / μ L
- D. < 150000 / μ L

Most procedures can be performed in patients with a platelet count of 50,000/ μ L. For major surgery, a count of about 80,000/ μ L is likely to be sufficient.

102 The major risk factor for arterial thrombosis is ?

Harrison's 18th Ed. 461

- A. Atherosclerosis
- B. Hyperhomocysteinemia
- C. Dysfibrinogenemia
- D. Hormonal therapy

The major risk factor for arterial thrombosis is atherosclerosis. Risk factors for venous thrombosis are immobility, surgery, underlying medical conditions, malignancy, hormonal therapy, obesity, and genetic predispositions.

103 Most coagulation assays are performed in plasma anticoagulated with ?

Harrison's 18th Ed. 462

- A. Ethylenediamine tetraacetic acid (EDTA)
- B. Sodium citrate
- C. Heparin
- D. Any of the above

Most coagulation assays are performed in sodium citrate anticoagulated plasma that is recalcified for the assay.

104 PT assesses the factors except ?

Harrison's 18th Ed. 462

- A. Factor I
- B. Factor II
- C. Factor V
- D. Factor VIII

PT assesses factors I (fibrinogen), II (prothrombin), V, VII, and X. PT only measures one aspect of hemostasis affected by liver dysfunction.

105 International normalized ratio (INR) is calculated by ?

Harrison's 18th Ed. 462

- A. PT ratio x International Sensitivity Index (ISI)
- B. PT ratio $\div$ International Sensitivity Index (ISI)
- C. PT ratio + International Sensitivity Index (ISI)

D. (PT ratio)^{International Sensitivity Index (ISI)}

International normalized ratio (INR) is calculated by the formula: $INR = (PT_{patient} / PT_{normal\ mean})^{ISI}$.

106 Activated partial thromboplastin time (aPTT) assesses which of the following factors ?

Harrison's 18th Ed. 462

- A. Factor VIII
- B. Factor IX
- C. Factor X
- D. All of the above

aPTT assesses the intrinsic & common coagulation pathways, factors XI, IX, VIII, X, V, II, fibrinogen, and also prekallikrein, high-molecular-weight kininogen & factor XII.

107 Structure of Fibrinogen is ?

Harrison's 18th Ed. 458 Figure 58-2

- A. Uninodular
- B. Binodular
- C. Trinodular
- D. Quadrinodular

Fibrinogen is a trinodular structure consisting of 2 D domains and 1 E domain.

108 Cross-linking of the D domains on adjacent fibrinogen molecules is done by ?

Harrison's 18th Ed. 458 Figure 58-2

- A. FX
- B. FXI
- C. FXII
- D. FXIIIa

Cross-linking of D domains on adjacent fibrinogen molecules is done by FXIIIa.

109 Which of the following about D-Dimers is false ?

Harrison's 18th Ed. 458

- A. Product of complete lysis of fibrin
- B. Released when plasmin acts on fibrin
- C. Relatively specific test of fibrin degradation
- D. Relatively specific test of fibrinogen degradation

D-Dimers are the product of complete lysis of fibrin, maintaining the cross-linked D domains. When plasmin acts on covalently cross-linked fibrin, D-dimers are released. D-dimers in plasma are a relatively specific test of fibrin rather than fibrinogen degradation. D-Dimer assays are a sensitive marker of blood clot formation and coagulation activation.

110 Normal level of D-Dimer in blood is ?

Harrison's 17th Ed. 1653

- A. < 500 pg/mL
- B. < 500 ng/mL
- C. < 500 μ g/mL
- D. < 500 mg/mL

Normal level of D-Dimer in blood is < 500 ng/mL.

111 Plasma level of D-Dimer is ?

Harrison's 17th Ed. Appendix Table 1

- A. 0.22 - 0.74 mg/mL
- B. 0.22 - 0.74 μ g/mL
- C. 0.22 - 0.74 ng/mL
- D. 0.22 - 0.74 pg/mL

Plasma level of D-Dimer is 0.22 - 0.74 μ g/mL.

112 D-dimer levels increase in patients with ?*Harrison's 17th Ed. Chapter 256, 96, 292*

- A. Myocardial infarction
- B. Pneumonia
- C. II or III trimester of pregnancy
- D. All of the above

D-dimer levels increase in myocardial infarction, pneumonia, intestinal ischemia, sepsis, cancer, postoperative state, initial infusion of human or humanized antibodies (rituximab, gemtuzumab, trastuzumab), and second or third trimester of pregnancy. D-dimer elevation is not as predictive of DVT in cancer patients as it is in patients without cancer.

113 Platelet interaction with vascular collagen is stabilized by ?*Harrison's 16th Ed. 337*

- A. Gp Ia/IIa
- B. Gp VI
- C. von Willebrand factor (vWF)
- D. FcRg

von Willebrand factor (vWF) is an adhesive glycoprotein that allows platelets to remain attached to the vessel wall despite the high shear forces generated within the vascular lumen by stabilizing interaction between platelets with collagen.

114 Platelet surface receptor GpIb / IX binds to ?*Harrison's 16th Ed. 338*

- A. vWF
- B. Fibrinogen
- C. Collagen
- D. All of the above

115 vWF forms a link between collagen fibrils & which of the following platelet receptor ?*Harrison's 16th Ed. 337, 338 Figure 53-2*

- A. Gp Ia/IIa
- B. Gp Ib/IX
- C. Gp VI
- D. All of the above

GpIb/IX complex binds vWF. Adhesion of platelets with vessel wall is stabilized by von Willebrand factor, which forms a bridge between collagen fibrils in the vessel wall & receptors on platelet glycoprotein Ib/IX. Similarly, platelet aggregation is mediated by fibrinogen, which links adjacent platelets via receptors on the platelet glycoprotein IIb/IIIa complex.

116 Formation of thromboxane A₂ (TXA₂) from arachidonic acid is mediated by enzyme ?*Harrison's 16th Ed. 338*

- A. Phospholipase C
- B. Phospholipase A₂
- C. Cyclooxygenase
- D. All of the above

Formation of TXA₂ from arachidonic acid is mediated by the enzyme cyclooxygenase.

117 Platelet surface receptor GpIa/IIa binds to ?*Harrison's 16th Ed. 338*

- A. vWF
- B. Fibrinogen
- C. Collagen
- D. All of the above

GpIa/IIa binds collagen.

118 Platelet surface receptor GpVI / FcγRIIa binds to ?*Harrison's 16th Ed. 338*

- A. vWF
- B. Fibrinogen
- C. Collagen
- D. All of the above

GpVI/FcγRIIa binds collagen.

119 After leaving bone marrow, what proportion of platelets are sequestered in spleen ?*Harrison's 16th Ed. 673*

- A. One-third
- B. One-half
- C. Two-thirds
- D. Three-fourths

120 The life span of platelets in circulation is about ?*Harrison's 16th Ed. 673*

- A. 1 to 3 days
- B. 3 to 5 days
- C. 5 to 7 days
- D. 7 to 10 days

After leaving bone marrow, ~one-third of platelets are sequestered in spleen, while the other two-thirds circulate for 7 to 10 days.

121 During menstrual cycle, platelet count rise at what time ?*Harrison's 16th Ed. 673*

- A. Following ovulation
- B. At the onset of menses
- C. After completion of menstrual flow
- D. Before ovulation

122 During menstrual cycle, platelet count fall at what time ?*Harrison's 16th Ed. 673*

- A. Following ovulation
- B. At the onset of menses
- C. After completion of menstrual flow
- D. Before ovulation

Platelet count varies in menstrual cycle, rising following ovulation & falling at onset of menses.

123 Platelet counts are decreased in which of the following deficiencies ?*Harrison's 16th Ed. 673*

- A. Severe Iron deficiency
- B. Folic acid deficiency
- C. Vitamin B12 deficiency
- D. All of the above

Platelet count are decreased in severe iron, folic acid or vitamin B12 deficiency.

124 Secondary or reactive thrombocytosis is due to which property of platelets ?*Harrison's 16th Ed. 674*

- A. Hormonal
- B. Acute-phase reactant
- C. Enzymatic

D. All of the above

Platelets are acute-phase reactants. Secondary or reactive thrombocytosis refers to an increase in platelet counts in patients with systemic inflammation, tumors, bleeding & mild iron deficiency.

125 Which of the following cytokines interleukins stimulate platelet production in acute inflammation ?

Harrison's 16th Ed. 674

- A. IL-3
- B. IL-6
- C. IL-11
- D. All of the above

Cytokines interleukin IL-3, IL-6 & IL-11 stimulate platelet production in acute inflammation.

126 Mechanism of thrombocytopenia include ?

Harrison's 16th Ed. 674

- A. Decreased bone marrow production
- B. Increased splenic sequestration
- C. Accelerated destruction
- D. All of the above

Thrombocytopenia is caused by decreased bone marrow production or increased splenic sequestration or accelerated destruction of platelets.

127 TAR syndrome means ?

Harrison's 16th Ed. 674

- A. Thrombocytopenia with absent reticulocytes
- B. Thrombocytopenia with absent renin
- C. Thrombocytopenia with absent radii
- D. Thrombocytopenia with abnormal vessels

Congenital amegakaryocytic hypoplasia & thrombocytopenia with absent radii (TAR syndrome) produce a selective decrease in megakaryocyte production.

128 Acute ITP is common in ?

Harrison's 16th Ed. 675

- A. Children
- B. Adults
- C. Elderly
- D. All of the above

Acute ITP is a severe thrombocytopenia following recovery from a viral exanthem or upper respiratory illness. It is common in children & is responsible 90% of pediatric cases of immunologic thrombocytopenia. >90% cases recover within 3 to 6 months.

129 Which of the following appear in the red cells of asplenic individuals ?

Harrison's 16th Ed. 675

- A. Macroovalocytes
- B. Basophilic stippling
- C. Howell-Jolly bodies
- D. Target cells

Howell-Jolly bodies are tiny nuclear remnants that are normally removed by spleen. They appear in blood after splenectomy & with maturation / dysplastic disorders.

130 Rituximab is what type of a monoclonal antibody ?

Harrison's 16th Ed. 676

- A. Anti-CD19
- B. Anti-CD20
- C. Anti-CD21

D. Anti-CD22

Rituximab is an anti-CD20 monoclonal antibody. Efficacy is established in ITP. It eliminates normal B cells that produce antiplatelet antibody.

Chapter 59. Enlargement of Lymph Nodes & Spleen

131 Generalized adenopathy means involvement of how many noncontiguous lymph node areas ?

Harrison's 18th Ed. 466

- A. One or more
- B. Two or more
- C. Three or more
- D. Four or more

Generalized adenopathy is defined as involvement of three or more noncontiguous lymph node areas. Localized or regional adenopathy implies involvement of a single anatomic area.

132 Which of the following is a cause of generalized lymphadenopathy ?

Harrison's 18th Ed. 466

- A. AIDS
- B. Systemic lupus erythematosus (SLE)
- C. Mixed connective tissue disease
- D. All of the above

Generalized lymphadenopathy is frequently associated with infectious mononucleosis (EBV) or cytomegalovirus (CMV), toxoplasmosis, AIDS, systemic lupus erythematosus (SLE), and mixed connective tissue disease. Acute and chronic lymphocytic leukemias and malignant lymphomas also produce generalized adenopathy in adults.

133 Occipital lymphadenopathy accompanies which of the following ?

Harrison's 18th Ed. 466

- A. Scalp infection
- B. Ear infection
- C. Conjunctival infections
- D. Tooth infection

Occipital adenopathy often reflects infection of the scalp.

134 Preauricular lymphadenopathy accompanies which of the following ?

Harrison's 18th Ed. 466

- A. Scalp infection
- B. Ear infection
- C. Conjunctival infections
- D. Tooth infection

Preauricular adenopathy accompanies conjunctival infections and cat-scratch disease.

135 Most frequent site of regional lymphadenopathy is ?

Harrison's 18th Ed. 466

- A. Axilla
- B. Neck
- C. Groin
- D. Abdominal

Most frequent site of regional lymphadenopathy is neck.

136 Which of the following about lymphadenopathy is false ?*Harrison's 18th Ed. 466*

- A. Most frequent site of regional lymphadenopathy is neck
- B. Enlargement of supraclavicular and scalene nodes is always abnormal
- C. Virchow's node is enlarged right supraclavicular node
- D. Sarcoidosis can cause supraclavicular adenopathy

Virchow's node is an enlarged left supraclavicular node infiltrated with metastatic cancer from a gastrointestinal primary.

137 Metastases to supraclavicular nodes occur from ?*Harrison's 18th Ed. 466*

- A. Lung
- B. Breast
- C. Testis
- D. Any of the above

Metastases to supraclavicular nodes occur from lung, breast, testis or ovarian cancers.

138 Which of the following is a cause of supraclavicular adenopathy ?*Harrison's 18th Ed. 466*

- A. Tuberculosis
- B. Sarcoidosis
- C. Toxoplasmosis
- D. All of the above

TB, sarcoidosis & toxoplasmosis are causes of supraclavicular adenopathy.

139 Benign lymphadenopathy is assumed when lymph node area is ?*Harrison's 18th Ed. 466*

- A. $< 0.25 \text{ cm}^2$
- B. $< 0.50 \text{ cm}^2$
- C. $< 0.75 \text{ cm}^2$
- D. $< 1.00 \text{ cm}^2$

Lymph nodes $< 1.0 \text{ cm}^2$ in area ($1 \times 1 \text{ cm}$ or less) are almost always secondary to benign, nonspecific reactive causes. Lymph node size of 2.25 cm^2 ($1.5 \times 1.5 \text{ cm}$) is the best size limit to differentiate malignant or granulomatous from other causes of lymphadenopathy.

140 Tenderness of lymph node is due to ?*Harrison's 18th Ed. 466*

- A. Inflammation of capsule
- B. Rupture of capsule
- C. Stretching of capsule
- D. All of the above

Lymph node tenderness occurs when the capsule is stretched during its rapid enlargement, usually secondary to an inflammatory process.

141 Which of the following is not a characteristic of enlarged lymph nodes in lymphoma ?*Harrison's 18th Ed. 466*

- A. Discrete
- B. Asymmetric
- C. Rubbery
- D. Nontender

Lymph nodes involved by lymphoma tend to be large, discrete, symmetric, rubbery, firm, mobile, and nontender.

142 Which of the following is characteristic of enlarged lymph nodes in metastatic cancer ?*Harrison's 18th Ed. 466*

- A. Hard
- B. Nonmovable
- C. Nontender
- D. All of the above

Lymph nodes containing metastatic cancer are hard, nontender & nonmovable.

143 Which parameter is used in ultrasonography of cervical nodes for distinguishing benign from malignant nodes ?*Harrison's 18th Ed. 467*

- A. Area
- B. Volume
- C. Ratio of long to short axis (L / S ratio)
- D. Sonodensity

On Ultrasonography of cervical nodes, a ratio of long to short axis of < 2.0 is useful in distinguishing benign & malignant nodes in patients with head & neck cancer.

144 Winterbottom's sign is a classic finding of ?*Harrison's 17th Ed. 1304*

- A. Giardiasis
- B. Toxoplasmosis
- C. Human African Trypanosomiasis
- D. Balantidiasis

145 In Winterbottom's sign, location of lymph node enlargement is ?*Harrison's 17th Ed. 1304*

- A. Axilla
- B. Posterior cervical triangle
- C. Submental
- D. Inguinal

*Lymphadenopathy of the posterior cervical triangle, or Winterbottom's sign, is a classic finding in *T. b. gambiense* trypanosomiasis.*

146 Romana's sign is a feature of ?*Harrison's 17th Ed. 1301*

- A. Acute Chagas' disease
- B. Cutaneous leishmaniasis
- C. Visceral leishmaniasis
- D. Babesiosis

Romana's sign is a classic finding in acute Chagas' disease, and consists of unilateral painless edema of palpebrae & periocular tissues when conjunctiva is the portal of entry. Generalized lymphadenopathy & hepatosplenomegaly may develop.

147 Enlarged, grayish yellow or orange tonsils are pathognomonic of ?*Harrison's 18th Ed. 3154*

- A. Waldenström's macroglobulinemia
- B. Polycythemia vera
- C. Wolman disease
- D. Tangier disease

Tangier disease is associated with cholesterol accumulation in reticuloendothelial system with hepatosplenomegaly & enlarged, grayish yellow or orange tonsils.

148 Painful preauricular lymphadenopathy is a feature of ?*Harrison's 17th Ed. 978*

- A. Cat-scratch disease
- B. Tularemia
- C. Tuberculosis
- D. Syphilis

Painful preauricular lymphadenopathy is unique to tularemia and distinguishes it from cat-scratch disease, tuberculosis, sporotrichosis, and syphilis.

149 Accessory spleens are seen in what percentage of persons ?*Harrison's 18th Ed. 467*

- A. 5 %
- B. 10 %
- C. 15 %
- D. 20 %

Embryologic origin of spleen is in dorsal mesogastrium at about 5 weeks' gestation as a series of hillocks that migrates to left upper quadrant. When these hillocks fail to unify into a single tissue mass, accessory spleens may develop in ~20% of persons.

150 Which of the following about structure of spleen is false ?*Harrison's 18th Ed. 468 Figure 59-1*

- A. White pulp is lymphoid in nature
- B. To return to circulation, RBCs traverse sinusoidal pores
- C. Pulp cords are dead ends
- D. None of the above

Spleen comprises many units of red and white pulp centered around small branches of splenic artery, called central arteries. White pulp is lymphoid in nature & contains B cell follicles, a marginal zone around the follicles, and T cell rich areas sheathing arterioles. Red pulp areas include pulp sinuses & pulp cords. Cords are dead ends. In order to regain access to the circulation, red blood cells must traverse tiny openings in the sinusoidal lining. Stiff, damaged, or old red cells cannot enter the sinuses.

151 Which of the following is a 'Red cell inclusion body' ?*Harrison's 18th Ed. 467*

- A. RBC parasites
- B. Howell-Jolly bodies
- C. Heinz bodies
- D. All of the above

Red cell inclusion bodies like parasites, nuclear residua (Howell-Jolly bodies, or denatured hemoglobin - Heinz bodies) are pinched off while passing through slits, a process called pitting.

152 Which of the following is false about spleen ?*Harrison's 18th Ed. 467*

- A. Normal spleen contains ~one-third of total body platelets
- B. Normal spleen contains significant no. of marginated neutrophils
- C. Spleen is in the portal circulation
- D. None of the above

153 Weight of a normal spleen is ?*Harrison's 18th Ed. 468*

- A. < 150 grams
- B. < 250 grams
- C. < 350 grams
- D. < 450 grams

Normal spleen weighs <250 grams.

154 Which of the following is false about spleen ?*Harrison's 18th Ed. 468*

- A. Decreases in size with age
- B. Lies entirely within rib cage
- C. Maximum cephalocaudad diameter is 13 cm by USG
- D. Maximum width of 14 cm by radionuclide scan

Spleen decreases in size with age, lies entirely within rib cage, has a maximum cephalocaudad diameter of 13 cm by USG or maximum length of 12 cm and/or width of 7 cm by radionuclide scan, and is normally not palpable.

155 Katayama fever is characterized by all except ?*Harrison's 17th Ed. 1333*

- A. Fever
- B. Generalized lymphadenopathy
- C. Lymphocytosis
- D. Hepatosplenomegaly

Acute schistosomiasis is called Katayama fever. It is a serum sickness like syndrome with fever, generalized lymphadenopathy, hepatosplenomegaly & high peripheral blood eosinophilia.

156 Middleton maneuver is used for splenic ?*Harrison's 18th Ed. 468*

- A. Inspection
- B. Palpation
- C. Percussion
- D. Auscultation

Palpation of spleen can be done by bimanual palpation, ballotment, and palpation from above (Middleton maneuver).

157 Which of the following is false in spleen examination ?*Harrison's 18th Ed. 468*

- A. Auscultation may reveal venous hum or friction rub
- B. Bimanual palpation in right lateral decubitus position adds nothing to supine examination
- C. Reproducibility among examiners is better for palpation than percussion
- D. None of the above

158 Nixon, Castell, or Barkun methods are used for splenic ?*Harrison's 18th Ed. 469*

- A. Inspection
- B. Palpation
- C. Percussion
- D. Auscultation

Percussion for splenic dullness is accomplished with either Nixon, Castell, or Barkun technique.

159 In Nixon's method, splenic enlargement is indicated when upper border of dullness above costal margin is ?*Harrison's 18th Ed. 469*

- A. > 4 cm
- B. > 8 cm
- C. > 12 cm
- D. > 16 cm

In Nixon's method, patient is in right decubitus. Percussion begins at lower level of pulmonary resonance in posterior axillary line & proceeds toward lower midanterior costal margin. Upper border of dullness is normally 6-8 cm above costal margin. Dullness >8 cm in adult indicates splenic enlargement.

160 In Castell's method, percussion in the lowest intercostal space is done in ?

Harrison's 18th Ed. 469

- A. Midclavicular line
- B. Anterior axillary line
- C. Midaxillary line
- D. Posterior axillary line

In Castell's method, patient is supine, percussion is done in lowest intercostal space in anterior axillary line. A dull percussion note on full inspiration suggests splenomegaly.

161 Massive splenomegaly is defined as spleen extending ?

Harrison's 18th Ed. 469

- A. > 2 cm below left costal margin
- B. > 4 cm below left costal margin
- C. > 6 cm below left costal margin
- D. > 8 cm below left costal margin

162 Massive splenomegaly is defined as spleen that weighs ?

Harrison's 18th Ed. 469

- A. > 250 gram
- B. > 500 gram
- C. > 750 gram
- D. > 1000 gram

Massive splenomegaly refers to spleen that extends >8 cm below left costal margin and/or weighs (drained) more than 1000 grams.

163 Causes of massive splenomegaly include ?

Harrison's 18th Ed. 471 Table 59-3

- A. Chronic myelogenous leukemia
- B. Lymphomas
- C. Hairy cell leukemia
- D. All of the above

164 Causes of massive splenomegaly include ?

Harrison's 18th Ed. 471 Table 59-3

- A. Myelofibrosis with myeloid metaplasia
- B. Polycythemia vera
- C. Gaucher's disease
- D. All of the above

165 Causes of Massive splenomegaly include ?

Harrison's 18th Ed. 471 Table 59-3

- A. Chronic lymphocytic leukemia
- B. Sarcoidosis
- C. Autoimmune hemolytic anemia
- D. All of the above

Causes of massive splenomegaly fall into four main categories: infectious diseases such as chronic malaria, kala-azar, and leishmaniasis; infiltrative diseases such as Gaucher's disease and Niemann-Pick disease; portal hypertension; and hematologic diseases, including myeloproliferative and lymphoproliferative disorders (N Engl J Med. 2001;345, 682).

166 'Abscopal effect' refers to ?

Harrison's 18th Ed. 471

- A. Ultrafiltration of abnormal RBCs
- B. Regression of systemic disease after splenectomy
- C. Increased tendency of enlarged splenic rupture
- D. Peritoneal seeding of splenic fragments

167 Term "splenosis" best relates to ?

Harrison's 18th Ed. 471

- A. Regression of systemic disease after splenectomy
- B. Ultrafiltration of abnormal RBCs
- C. Iatrogenic splenic rupture
- D. Ectopic spleen tissue

At times in patients with splenic rupture, peritoneal seeding of splenic fragments can lead to splenosis i.e. presence of multiple collections of spleen tissue not connected to portal circulation. This ectopic spleen tissue may cause pain or gastrointestinal obstruction, as in endometriosis.

168 Which out of the following is a contraindication for splenectomy ?

Harrison's 18th Ed. 471

- A. Iatrogenic splenic rupture
- B. Thrombocytopenia
- C. Presence of bone marrow failure
- D. Hairy cell leukemia

The only contraindication to splenectomy is the presence of marrow failure, in which the enlarged spleen is the only source of hematopoietic tissue.

169 Chronic manifestations of splenectomy include ?

Harrison's 18th Ed. 471

- A. Howell-Jolly bodies
- B. Heinz bodies
- C. Basophilic stippling
- D. All of the above

Chronic manifestations of splenectomy include anisocytosis, poikilocytosis, presence of Howell-Jolly bodies (nuclear remnants), Heinz bodies (denatured hemoglobin), basophilic stippling.

170 Frequency of a serious infection following splenectomy is highest within ?

Harrison's 18th Ed. 471

- A. First 6 months
- B. First 1 year
- C. First 3 years
- D. First 5 years

Frequency of a serious infection following splenectomy is highest within first 3 years.

171 Which of the following is false in postsplenectomy period ?

Harrison's 18th Ed. 471

- A. Increased susceptibility to capsulated bacterial infections
- B. No increased risk of viral infection
- C. Increased susceptibility to babesiosis
- D. None of the above

172 In elective splenectomy, pneumococcal vaccine should be administered how many weeks before surgery ?

Harrison's 18th Ed. 471

- A. 1 weeks
- B. 2 weeks
- C. 3 weeks
- D. 4 weeks

Pneumococcal vaccine (23-valent polysaccharide vaccine) should be administered to all patients 2 weeks before elective splenectomy.

Chapter 60. Disorders of granulocytes & monocytes

173 Which of the following is a leukocyte ?

Harrison's 18th Ed. 472

- A. Natural killer (NK) cell
- B. B lymphocyte
- C. Monocyte
- D. All of the above

Leukocytes include neutrophils, T and B lymphocytes, natural killer (NK) cells, monocytes, eosinophils, and basophils.

174 Which of the following statements about leukocytes is false ?

Harrison's 18th Ed. 472

- A. Derived from common stem cell in bone marrow
- B. Threefourths of nucleated cells of bone marrow are committed to leukocyte production
- C. Their maturation in marrow is regulated by colony-stimulating factors & interleukins
- D. None of the above

Leukocytes are derived from a common stem cell in bone marrow. Three-fourths of nucleated cells of bone marrow are committed to production of leukocytes. Leukocyte maturation in the marrow is under the regulatory control of colony-stimulating factors (CSFs) & interleukins (ILs).

175 Minimum number of stem cells necessary to support hematopoiesis is ?

Harrison's 18th Ed. 472

- A. 100 to 200
- B. 200 to 300
- C. 300 to 400
- D. 400 to 500

Minimum number of stem cells necessary to support hematopoiesis is 400 - 500 at any one time.

176 Colony-stimulating factors are produced by ?

Harrison's 18th Ed. 472

- A. Monocytes
- B. Tissue macrophages
- C. Stromal cells
- D. All of the above

Human blood monocytes, tissue macrophages & stromal cells produce CSFs, hormones required for growth of monocytes & neutrophils in bone marrow.

177 In a 80 kg person, how many neutrophils are produced by hematopoietic system per day ?

Harrison's 18th Ed. 472

- A. $\sim 0.3 \times 10^{11}$
- B. $\sim 1.3 \times 10^{11}$
- C. $\sim 2.3 \times 10^{11}$
- D. $\sim 3.3 \times 10^{11}$

In a 80 kg person, $\sim 1.3 \times 10^{11}$ neutrophils are produced by hematopoietic system per day.

178 Maturation from metamyelocyte to neutrophil takes how many days ?

Harrison's 18th Ed. 472

- A. 2 days

- B. 5 days
- C. 7 days
- D. 10 days

Proliferation phase through the metamyelocyte takes ~ 1 week, while maturation phase from metamyelocyte to mature neutrophil takes ~ 1 week.

179 Which of the following is the largest cell in size ?

Harrison's 18th Ed. 472 Figure 60-2

- A. Myeloblast
- B. Promyelocyte
- C. Myelocyte
- D. Metamyelocyte

180 Primary or azurophil granules are present in ?

Harrison's 18th Ed. 472

- A. Myeloblast
- B. Promyelocyte
- C. Myelocyte
- D. All of the above

Classic lysosomal granules called the primary or azurophil granules are found in promyelocyte.

181 Primary or azurophil granules contain ?

Harrison's 18th Ed. 472

- A. Hydrolases
- B. Cathepsin G
- C. Myeloperoxidase
- D. All of the above

Primary granules contain hydrolases, elastase, myeloperoxidase, cathepsin G, cationic proteins, bactericidal/permeability-increasing protein & defensins.

182 Which of the following azurophil granules has broad antimicrobial activity against bacteria, fungi & certain enveloped viruses ?

Harrison's 18th Ed. 472

- A. Hydrolases
- B. Cathepsin G
- C. Myeloperoxidase
- D. Defensins

Defensins in azurophil granules have a broad antimicrobial activity against bacteria, fungi, and certain enveloped viruses.

183 Specific or secondary granules are present in ?

Harrison's 18th Ed. 472

- A. Myeloblast
- B. Promyelocyte
- C. Myelocyte
- D. All of the above

184 Secondary granules contain all except ?

Harrison's 18th Ed. 472

- A. Acid hydrolases
- B. Lactoferrin
- C. Vitamin B₁₂ binding protein
- D. Histaminase

Myelocyte synthesises specific or secondary granules which contains lactoferrin, vitamin B₁₂

binding protein, membrane components of reduced nicotinamide-adenine dinucleotide phosphate (NADPH) oxidase, histaminase, and laminin. Secondary granules do not contain acid hydrolases.

185 Packaging of secondary granule contents during myelopoiesis is controlled by ?

Harrison's 18th Ed. 472

- A. CCAAT/enhancer binding protein- α
- B. CCAAT/enhancer binding protein- β
- C. CCAAT/enhancer binding protein- γ
- D. CCAAT/enhancer binding protein- ϵ

Packaging of secondary granule contents during myelopoiesis is controlled by CCAAT/enhancer binding protein- ϵ .

186 Excessive segmentation of nucleus of neutrophils is a manifestation of ?

Harrison's 18th Ed. 473

- A. Folate or vitamin B₁₂ deficiency
- B. Iron deficiency
- C. Thalassemia
- D. Repeated blood transfusion

Nucleus of neutrophils normally contains up to four segments. Excessive segmentation (>5 nuclear lobes) is seen in folate or vitamin B₁₂ deficiency & congenital neutropenia syndrome of warts, hypogammaglobulinemia, infections & myelokathexis (WHIM).

187 Which of the following is false about 'Pelger-Huet anomaly' ?

Harrison's 18th Ed. 473 Figure 60-5

- A. Benign disorder
- B. Majority of granulocytes are bilobed
- C. Nucleus has spectacle-like configuration
- D. None of the above

Pelger-Huet anomaly is a benign inherited disorder. Majority of granulocytes are bilobed (hyposegmented neutrophils). Nucleus has a spectacle-like, or "pince-nez" configuration.

188 Under normal conditions, what proportion of neutrophil pool is in the bone marrow ?

Harrison's 18th Ed. 473

- A. ~ 20 %
- B. ~ 50 %
- C. ~ 70 %
- D. ~ 90 %

189 Under normal conditions, what proportion of neutrophil pool is in the circulation ?

Harrison's 18th Ed. 473

- A. ~ 2 %
- B. ~ 20 %
- C. ~ 50 %
- D. ~ 90 %

Normally, ~90% of the neutrophil pool is in bone marrow, 2 - 3% in circulation (freely flowing & marginated), & remainder in tissues.

190 Marginated leukocytes are maximum in ?

Harrison's 18th Ed. 473

- A. Lungs
- B. Spleen
- C. Liver
- D. Kidneys

Circulating pool of neutrophils exists in two dynamic compartments: one freely flowing and one marginated. Freely flowing pool is ~half the neutrophils in basal state and is composed of those cells that are in the blood and not in contact with endothelium. Marginated leukocytes are those that are in close physical contact with endothelium. Due to extensive capillary bed (~1000 capillaries per alveolus) in pulmonary circulation, margination occurs because the capillaries are about the same size as a mature neutrophil.

191 "Rolling" of the neutrophil along the endothelial surface is a function of ?

Harrison's 18th Ed. 473

- A. Selectins
- B. Integrins
- C. Intercellular adhesion molecules
- D. Opsonins

Selectins are glycoproteins expressed on neutrophils & endothelial cells and cause a low-affinity interaction resulting in "rolling" of neutrophil along the endothelial surface.

192 Neutrophils "stick" to the endothelium through ?

Harrison's 18th Ed. 473

- A. Selectins
- B. Integrins
- C. Intercellular adhesion molecules
- D. Opsonins

In response to chemotactic stimuli from injured tissues or bacterial products, neutrophil adhesiveness increases and they "stick" to the endothelium through integrins. Integrins are leukocyte glycoproteins that bind to specific endothelial receptors [intercellular adhesion molecules (ICAM) 1 & 2].

193 Diapedesis involves which of the following ?

Harrison's 18th Ed. 474

- A. PECAM 1
- B. Anaphylatoxins
- C. Vascular endothelial growth factor (VEGF)
- D. Prostaglandins E & I

Process of migration into tissues is called diapedesis and involves crawling of neutrophils between postcapillary endothelial cells that open junctions between adjacent cells to permit leukocyte passage. Diapedesis involves platelet/endothelial cell adhesion molecule (PECAM) 1 (CD31) expressed on emigrating leukocyte & endothelial cells.

194 In the healthy adult, most neutrophils leave the body by ?

Harrison's 18th Ed. 475

- A. Migration through mucous membrane of GI tract
- B. Apoptosis
- C. Phagocytosis
- D. All of the above

In the healthy adult, most neutrophils leave the body by migration through the mucous membrane of the gastrointestinal tract.

195 Normally, neutrophils spend how much time in circulation ?

Harrison's 18th Ed. 475

- A. 2 to 3 hours
- B. 6 to 7 hours
- C. 12 to 24 hours
- D. 24 to 36 hours

Normally, neutrophils spend a short time in circulation (half-life, 6 - 7 hours).

196 Senescent neutrophils are cleared from the circulation by macrophages in ?

Harrison's 18th Ed. 475

- A Kidneys
- B Lung
- C GI tract
- D Thymus

Senescent neutrophils are cleared from the circulation by macrophages in the lung and spleen.

197 Characteristic green color to pus is due to ?

Harrison's 18th Ed. 475

- A Collagenase
- B Elastase
- C Myeloperoxidase
- D All of the above

Myeloperoxidase confers the characteristic green color to pus and may participate in turning off the inflammatory process by inactivating chemoattractants and immobilizing phagocytic cells.

198 Which of the following is not a group of chemokines ?

Harrison's 18th Ed. 475

- A C
- B CC
- C CCC
- D CXC

Four major groups of chemokines are recognized based on cysteine structure near N terminus: C, CC, CXC, and CXXXC. C chemokine (lymphotactin) is T cell tropic. CC chemokines (MIP-1) attract lymphocytes, monocytes, eosinophils, & basophils. CXC cytokines (IL-8) attract neutrophils. CXXXC chemokine (fractalkine) attracts neutrophils, monocytes, & T cells.

199 Susceptibility to infectious diseases increases sharply when neutrophil counts fall below ?

Harrison's 18th Ed. 476

- A 1000 cells/ μ L
- B 2000 cells/ μ L
- C 3000 cells/ μ L
- D 4000 cells/ μ L

Susceptibility to infectious diseases increases sharply when neutrophil counts fall <1000 cells/ μ L.

200 Inflammatory process is absent, when absolute neutrophil count (ANC) falls below ?

Harrison's 18th Ed. 476

- A < 100 cells / μ L
- B < 200 cells / μ L
- C < 500 cells / μ L
- D < 1000 cells / μ L

When absolute neutrophil count (band forms & mature neutrophils combined) is <200/ μ L, the inflammatory process is absent.

201 Neutropenia can be due to ?

Harrison's 18th Ed. 476

- A Depressed production
- B Increased peripheral destruction
- C Excessive peripheral pooling
- D All of the above

Neutropenia can be due to depressed production, increased peripheral destruction, or excessive peripheral pooling.

202 Which of the following drugs cause neutropenia due to decreased production ?

Harrison's 18th Ed. 476 Table 60-1

- A Carbamazepine
- B Clozapine
- C Antithyroid drugs
- D All of the above

drugs cause neutropenia due to decreased production include alkylating agents (nitrogen mustard, busulfan, chlorambucil, cyclophosphamide), antimetabolites (methotrexate, 6-mercaptopurine, 5-flucytosine), antibiotics (chloramphenicol, penicillins, sulfonamides), phenothiazines, tranquilizers (meprobamate), anticonvulsants (carbamazepine), antipsychotics (clozapine), certain diuretics, anti-inflammatory agents, antithyroid drugs.

203 Which of the following drugs act as haptens to cause neutropenia due to peripheral destruction ?

Harrison's 18th Ed. 476 Table 60-1

- A Alpha methyl dopa
- B Phenylbutazone
- C Mercurial diuretics
- D All of the above

Drugs that act as haptens to cause neutropenia due to peripheral destruction include aminopyrine, alpha methyl dopa, phenylbutazone, mercurial diuretics, some phenothiazines.

204 Which of the following is a cause of neutropenia due to peripheral pooling (Transient neutropenia) ?

Harrison's 18th Ed. 476 Table 60-1

- A Overwhelming bacterial infection (acute endotoxemia)
- B Hemodialysis
- C Cardiopulmonary bypass
- D All of the above

205 Congenital forms of neutropenia include ?

Harrison's 18th Ed. 476

- A Kostmann's syndrome
- B Shwachman-Diamond syndrome
- C WHIM syndrome
- D All of the above

Congenital forms of neutropenia include Kostmann's syndrome, cartilage-hair hypoplasia syndrome, Shwachman-Diamond syndrome, WHIM syndrome and hereditary cyclic neutropenia.

206 Kostmann's syndrome is due to mutations in ?

Harrison's 18th Ed. 476

- A Potassium voltage-gated channel gene KCNA1
- B PKD-1 gene
- C Anti-apoptosis gene HAX-1
- D GJB2 gene

Kostmann's syndrome is due to mutations in anti-apoptosis gene HAX-1.

207 Which of the following is associated with pancreatic insufficiency ?

Harrison's 18th Ed. 476

- A Kostmann's syndrome
- B Shwachman-Diamond syndrome
- C WHIM syndrome
- D All of the above

Shwachman-Diamond syndrome is associated with pancreatic insufficiency and is due to mutations in the Shwachman-Bodian-Diamond syndrome gene SBDS.

208 Felty's syndrome include all except ?

Harrison's 18th Ed. 476

- A. Rheumatoid arthritis
- B. Hepatomegaly
- C. Splenomegaly
- D. Neutropenia

Rheumatoid arthritis, splenomegaly & neutropenia form the triad of Felty's syndrome. Neutropenia is due to antibodies produced by spleen that shorten neutrophil life span, while large granular lymphocytes (LGL) can attack marrow neutrophil precursors.

209 Neutrophilia results from ?

Harrison's 18th Ed. 477

- A. Increased neutrophil production
- B. Increased marrow release
- C. Defective margination
- D. All of the above

Neutrophilia is due to increased neutrophil production & marrow release or defective margination.

210 Persistent neutrophilia with what level of raised cell counts is called leukemoid reaction ?

Harrison's 18th Ed. 477

- A. > 10000 to 30000 / μ L
- B. > 30000 to 50000 / μ L
- C. > 50000 to 75000 / μ L
- D. > 75000 to 100000 / μ L

211 Which of the following is false about leukemoid reaction ?

Harrison's 18th Ed. 477

- A. Neutrophil cell count > 30000 to 50000 / μ L
- B. Circulating neutrophils are mature
- C. Circulating neutrophils are clonally derived
- D. None of the above

Persistent neutrophilia with cell counts of 30,000 - 50,000/ μ L is called a leukemoid reaction. In leukemoid reaction, circulating neutrophils are usually mature & not clonally derived.

212 Which of the following drugs can cause neutrophilia ?

Harrison's 18th Ed. 477 Table 60-2

- A. Meprobamate
- B. Lithium
- C. Phenothiazines
- D. Phenylbutazone

Epinephrine, glucocorticoids, nonsteroidal anti-inflammatory agents, lithium, , granulocyte colony-stimulating factor (G-CSF) can cause neutrophilia.

213 Which of the following about leukocyte adhesion deficiency (LAD) 1 & 2 is false ?

Harrison's 18th Ed. 477

- A. Autosomal dominant traits
- B. Inability of neutrophils to exit circulation
- C. Leukocytosis
- D. Increased susceptibility to infection

LAD 1 & 2 are autosomal recessive traits leading to inability of neutrophils to exit circulation to sites of infection, leukocytosis & increased susceptibility to infection.

214 Patients with leukocyte adhesion deficiency 1 (LAD 1) have mutations in ?

Harrison's 18th Ed. 477

- A. CD18
- B. CD31
- C. CD34
- D. CD62

Patients with LAD1 have mutations in CD18. CD18 gene is located on distal chromosome 21q.

215 Which of the following is called "Congenital disorder of glycosylation IIc (CDGIIc)" ?

Harrison's 18th Ed. 479

- A. Leukocyte adhesion deficiency 1 (LAD 1)
- B. Leukocyte adhesion deficiency 2 (LAD 2)
- C. Leukocyte adhesion deficiency 3 (LAD 3)
- D. None of the above

LAD 2 is also known as congenital disorder of glycosylation IIc (CDGIIc) due to mutation in a GDP-fucose transporter (SLC35C1).

216 In neutrophils, which of the following is seen in severe acute bacterial infections ?

Harrison's 17th Ed. 377

- A. Toxic granulations
- B. Döhle bodies
- C. Large neutrophil vacuoles
- D. All of the above

In severe acute bacterial infection toxic granulations (immature or abnormally staining azurophil granules), Döhle bodies (cytoplasmic inclusions which are fragments of ribosome-rich endoplasmic reticulum) & large neutrophil vacuoles (pinocytosed or internalized membrane) are seen.

217 Which of the following is false about 'Dohle body' ?

Harrison's 18th Ed. 473 Figure Figure 60-3

- A. Discrete, blue-staining nongranular areas found in periphery of cytoplasm of neutrophils
- B. Found in infections and other toxic states
- C. Aggregates of rough endoplasmic reticulum
- D. None of the above

Döhle bodies are discrete, blue-staining nongranular areas found in periphery of cytoplasm of neutrophil in infections & toxic states. They are aggregates of rough endoplasmic reticulum.

218 For lymphocytes, "CD" stands for ?

Harrison's 16th Ed. 350

- A. Clonal determinant
- B. Cluster determinant
- C. Capsule determinant
- D. Cell determinant

219 Which of the following is false about Chédiak-Higashi syndrome (CHS) ?

Harrison's 18th Ed. 479

- A. Autosomal recessive inheritance
- B. Defects in lysosomal transport protein LYST
- C. Abnormal packaging & disbursement of granules
- D. None of the above

CHS is a systemic disease with autosomal recessive inheritance due to defects in the lysosomal transport protein LYST required for normal packaging and disbursement of granules, encoded by the gene CHS1 at 1q42. Characterized by the presence of giant lysosomes within leukocytes.

220 Patients with Chédiak-Higashi syndrome (CHS) may have which of the following ?

Harrison's 18th Ed. 479

- A. Seizure
- B. Blindness
- C. Nystagmus
- D. Tremors

Patients with CHS have nystagmus, partial oculocutaneous albinism, and an increased frequency of infections. Patients may develop a severe disabling peripheral neuropathy in adulthood. Vitamin C supplementation is useful in Chédiak-Higashi syndrome. Hematopoietic cell transplantation can cure patients of CHS.

221 Leukocytes from patients with chronic granulomatous disease (CGD) have severely diminished production of ?

Harrison's 18th Ed. 479

- A. Hydrogen peroxide
- B. Nitric oxide
- C. IL-1
- D. TNF-alpha

Leukocytes from patients with CGD have severely diminished hydrogen peroxide production.

222 Frequency of which of the following is increased in CGD ?

Harrison's 18th Ed. 480

- A. Immune thrombocytopenic purpura (ITP)
- B. Juvenile rheumatoid arthritis
- C. Discoid lupus
- D. All of the above

223 Mononuclear phagocyte system is composed of ?

Harrison's 18th Ed. 480

- A. Monoblasts
- B. Promonocytes
- C. Monocytes
- D. All of the above

Mononuclear phagocyte system is composed of monoblasts, promonocytes, monocytes and tissue macrophages.

224 Monocytes have a half-life in the blood of ?

Harrison's 18th Ed. 480

- A. 1 to 3 hours
- B. 6 to 7 hours
- C. 12 to 24 hours
- D. 24 to 36 hours

Monocytes have a half-life in blood of 12 - 24 hours.

225 "Big eaters" is the term used for ?

Harrison's 18th Ed. 480

- A. Neutrophils
- B. Monocytes
- C. Macrophages
- D. None of the above

Macrophages are called "big eaters". They differentiate from blood monocytes that arrive in tissues.

226 Function of macrophage secreted product - IL-1 is ?

Harrison's 18th Ed. 480

- A. Initiating fever in hypothalamus

- B. Mobilizing leukocytes from bone marrow
- C. Activating lymphocytes & neutrophils
- D. All of the above

Functions of IL-1 include initiating fever in hypothalamus, mobilizing leukocytes from bone marrow and activating lymphocytes & neutrophils.

227 TNF- α duplicates the function of which of the following ?

Harrison's 18th Ed. 480

- A. IL-1
- B. IL-8
- C. IL-12
- D. IL-18

TNF- α is a pyrogen that duplicates many actions of IL-1. It plays significant role in the pathogenesis of gram-negative shock.

228 Monocytopenia occurs with ?

Harrison's 18th Ed. 481

- A. Acute infections
- B. Glucocorticoid therapy
- C. Aplastic anemia
- D. All of the above

229 Monocytopenia occurs with ?

Harrison's 18th Ed. 481

- A. Hairy cell leukemia
- B. Acute myeloid leukemia
- C. Stress
- D. All of the above

Monocytopenia occurs with acute infections, stress, glucocorticoid use, aplastic anemia, hairy cell leukemia, acute myeloid leukemia & use of myelotoxic drugs.

230 Monocytosis is associated with ?

Harrison's 18th Ed. 480

- A. Tuberculosis
- B. Brucellosis
- C. Subacute bacterial endocarditis
- D. All of the above

231 Monocytosis is associated with ?

Harrison's 18th Ed. 480

- A. Malaria
- B. Visceral leishmaniasis (kala azar)
- C. Hemolytic anemias
- D. All of the above

Monocytosis is associated with TB, brucellosis, SABA, Rocky Mountain spotted fever, malaria, visceral leishmaniasis (kala azar), leukemias, myeloproliferative syndromes, hemolytic anemias, chronic idiopathic neutropenias & granulomatous diseases like sarcoidosis & regional enteritis.

232 "TRAPS" stands for ?

Harrison's 18th Ed. 480

- A. Tumour associated periodic syndromes
- B. TNF- α receptor associated periodic syndromes
- C. Thyroid associated periodic syndromes
- D. T receptor associated periodic syndromes

Gain-of-function mutations in TNF- α receptor cause TNF- α receptor-associated periodic syndrome (TRAPS) characterized by recurrent fever without infection (persistent stimulation of TNF- α receptor).

233 Familial Mediterranean fever due to mutations in PYRIN is due to abnormal regulation of ?

Harrison's 18th Ed. 480

- A IL-1
- B IL-8
- C IL-12
- D IL-18

Diseases with abnormal IL-1 regulation leading to fever include familial Mediterranean fever due to mutations in PYRIN.

234 Mutations in cold-induced autoinflammatory syndrome 1 (CIAS1) lead to ?

Harrison's 18th Ed. 480

- A Neonatal-onset multisystem autoinflammatory disease
- B Familial cold urticaria
- C Muckle-Wells syndrome
- D All of the above

Mutations in cold-induced autoinflammatory syndrome 1 (CIAS1) lead to neonatal-onset multisystem autoinflammatory disease, familial cold urticaria, and Muckle-Wells syndrome.

235 Mutations in CD2BP1 cause which of the following ?

Harrison's 18th Ed. 481

- A PAPA syndrome
- B Muckle-Wells syndrome
- C Familial cold urticaria
- D Familial Mediterranean fever

The syndrome of pyoderma gangrenosum, acne, and sterile pyogenic arthritis (PAPA syndrome) is caused by mutations in CD2BP1.

236 Which of the following is a TNF- α antagonist ?

Harrison's 18th Ed. 481

- A Infliximab
- B Adalimumab
- C Etanercept
- D All of the above

TNF- α antagonists are infliximab, adalimumab, certolizumab, and etanercept.

237 Specific chemokine expressed by eosinophils is ?

Harrison's 18th Ed. 481

- A Eotaxin
- B Eosinotaxin
- C Eosinophilotaxin
- D All of the above

Eosinophils express a specific chemokine EOTAXIN.

238 Which of the following is false about eosinophils ?

Harrison's 18th Ed. 481

- A Shorter half life than neutrophils
- B Eosinophils can recirculate
- C During most infections, eosinophils are not important
- D Central role in defense against invasive helminthic infections

Eosinophils have a longer half life than neutrophils. Unlike neutrophils, tissue eosinophils can recirculate. During most infections, eosinophils are not important but plays a central role in host defense in invasive helminthic infections.

239 Which of the following is false about eosinophil granule ?

Harrison's 18th Ed. 481

- A Arginine-rich protein content
- B Histaminase activity
- C Contain eosinophil peroxidase
- D None of the above

Eosinophil granule contains arginine-rich protein in its crystalline core which has histaminase activity, eosinophil peroxidase that catalyzes oxidation by hydrogen peroxide.

240 Charcot-Leyden crystal protein in eosinophil cytoplasm is ?

Harrison's 18th Ed. 481

- A Hyaluronidase
- B Phospholipase
- C Lysophospholipase
- D Immunoglobulin E

Eosinophil cytoplasm contains Charcot-Leyden crystal protein which is a lysophospholipase.

241 Eosinophilia refers to how many eosinophils per microliter of blood ?

Harrison's 18th Ed. 481

- A > 200
- B > 300
- C > 400
- D > 500

Eosinophilia is the presence of >500 eosinophils per μ L of blood.

242 Eosinophilia is due to allergic reaction which of the following drugs ?

Harrison's 18th Ed. 481

- A Iodides
- B Aspirin
- C Nitrofurantoin
- D All of the above

243 Eosinophilia is associated with which of the following diseases ?

Harrison's 18th Ed. 481

- A Serum sickness
- B Eczema
- C Pemphigus
- D All of the above

244 Eosinophilia is associated with which of the following malignancies ?

Harrison's 18th Ed. 481

- A Cancer pancreas
- B Cancer ovary
- C Cancer uterus
- D All of the above

Eosinophilia occurs in allergic reaction to drugs (iodides, aspirin, sulfonamides, nitrofurantoin, penicillins & cephalosporins), allergies (hay fever, asthma, eczema, serum sickness, allergic vasculitis, & pemphigus), collagen vascular diseases (RA, eosinophilic fasciitis, allergic angitis & PAN), malignancies (Hodgkin's disease; mycosis fungoides; CML, Ca. lung, stomach, pancreas, ovary, uterus), Job's syndrome & CGD, and helminthic infections.

245 Which of the following is the dominant eosinophil growth factor ?

Harrison's 18th Ed. 481

- A IL-1

- B. IL-3
- C. IL-5
- D. All of the above

IL-5 is the dominant eosinophil growth factor.

246 Which of the following is false about eosinophilia-myalgia syndrome ?

Harrison's 18th Ed. 481

- A. Eosinophil count > 1000/ μ L
- B. Caused by ingesting contaminants in L-tryptophan containing products
- C. Responds to glucocorticoids
- D. None of the above

247 Which of the following is an adverse effect of eosinopenia ?

Harrison's 18th Ed. 482

- A. Cardiac arrhythmias
- B. Myopathy
- C. Pulmonary fibrosis
- D. None of the above

There is no known adverse effect of eosinopenia.

248 Which of the following is false about hyperimmunoglobulin E–recurrent infection (HIE) syndrome ?

Harrison's 18th Ed. 482

- A. Also called Job's syndrome
- B. 'Cold' skin abscesses
- C. Kyphoscoliosis
- D. Obstructive lung disease

Hyperimmunoglobulin E - recurrent infection syndrome is also called Job's syndrome, characterized by typical facies with broad nose, kyphoscoliosis, osteoporosis & eczema. Primary teeth erupt normally but do not deciduate requiring extraction. Patients develop recurrent sinopulmonary & cutaneous infections much less inflamed than expected ("cold abscesses").

249 Which of the following is performed to assess bone marrow reserves ?

Harrison's 18th Ed. 482

- A. Steroid challenge test
- B. Epinephrine challenge test
- C. Endotoxin challenge test
- D. All of the above

Assessment of bone marrow reserves of WBC's is done by steroid challenge test. Epinephrine challenge test is for marginated circulating pool of cells & endotoxin challenge test is for their marginating ability.

250 In vivo assessment of inflammation is done by ?

Harrison's 18th Ed. 482

- A. Rebeck skin window test
- B. Nitroblue tetrazolium (NBT) dye test
- C. Dihydrorhodamine (DHR) oxidation test
- D. All of the above

In vivo assessment of inflammation is done by Rebeck skin window test or skin blister assay, which measures the ability of leukocytes & inflammatory mediators to accumulate locally in skin. NBT & DHR tests are for detecting deficiencies of oxidative metabolism.

251 Which of the following drugs is useful to restore myelopoiesis in neutropenia due to impaired production ?

Harrison's 18th Ed. 482

- A. Androgens

- B. Glucocorticoids
- C. Lithium
- D. All of the above

Apart from recombinant G-CSF, androgens, glucocorticoids, lithium & immunosuppressive therapy are used to restore myelopoiesis in patients with neutropenia due to impaired production.

Chapter 103. Iron Deficiency and Other Hypoproliferative Anemias

252 Which of the following is false about hypoproliferative anemias ?

Harrison's 18th Ed. 844

- A. Normocytic RBC's
- B. Normochromic RBC's
- C. Reticulocyte index < 2.0 - 2.5
- D. None of the above

Anemias associated with normocytic and normochromic red cells and an inappropriately low reticulocyte response (reticulocyte index < 2.0 - 2.5) are hypoproliferative anemias.

253 Which of the following is a hypoproliferative anemia ?

Harrison's 18th Ed. 844

- A. Anemia of acute and chronic inflammation
- B. Anemia of hypometabolic states
- C. Anemias from marrow damage
- D. All of the above

Hypoproliferative anemias include early iron deficiency, acute and chronic inflammation, renal disease, hypometabolic states (protein malnutrition & endocrine deficiencies), and anemias from marrow damage.

254 Most common anemia among hypoproliferative anemias is ?

Harrison's 18th Ed. 844

- A. Anemias associated with renal disease
- B. Anemias associated with chronic inflammation
- C. Anemias associated with cancer
- D. Anemias associated with hypometabolic states

anemia associated with chronic inflammation is the most common of the above mentioned hypoproliferative anemias. All these are characterized by an abnormal erythropoietin response to the anemia.

255 Which of the following is called iron transport protein ?

Harrison's 18th Ed. 844

- A. Ferritin
- B. Transferrin
- C. Divalent metal transporter 1 (DMT1)
- D. All of the above

Iron absorbed from the diet or released from stores circulates in the plasma bound to transferrin, the iron transport protein.

256 Turnover or half-clearance time of transferrin-bound iron is ?

Harrison's 18th Ed. 844

- A. 5 - 10 minutes
- B. 10 - 30 minutes
- C. 30 - 60 minutes
- D. 60 - 90 minutes

Turnover or half-clearance time of transferrin-bound iron is 60 - 90 minutes.

257 Which of the following has the highest affinity for transferrin receptors ?
Harrison's 18th Ed. 844
A. Monoferric transferrin
B. Diferric transferrin
C. Apotransferrin
D. All of the above

Iron-transferrin complex in plasma interacts with specific transferrin receptors on marrow erythroid cell surface. Diferric transferrin has the highest affinity for transferrin receptors. Apotransferrin does not carry iron and has very little affinity for transferrin receptors.

258 Daily requirement of dietary iron in adult man is ?
Harrison's 18th Ed. 844 Figure 103-1
A. 1 mg
B. 2 mg
C. 3 mg
D. 4 mg

Normally, an adult male needs ~1 mg of elemental iron daily, while females in childbearing years need 1.4 mg/day.

259 During the last two trimesters of pregnancy, daily iron requirements increase to ?
Harrison's 18th Ed. 845
A. 2 to 3 mg
B. 3 to 4 mg
C. 4 to 5 mg
D. 5 to 6 mg

During the last two trimesters of pregnancy, daily iron requirements increase to 5 - 6 mg/day.

260 Transferrin-receptor complex is internalized via ?
Harrison's 18th Ed. 845
A. Etharin-coated pits
B. Megalin-coated pits
C. Clathrin-coated pits
D. Azalin-coated pits

Transferrin-receptor complex is internalized via clathrin-coated pits and transported to an acidic endosome, where iron is released at a low pH.

261 In erythroid cell, excess iron binds to which of the following to form ferritin ?
Harrison's 18th Ed. 845
A. Apoferritin
B. Transferritin
C. Coferritin
D. Endoferritin

In erythroid cell, excess iron binds to Apoferritin to form ferritin.

262 What proportion of red cells turn over each day ?
Harrison's 18th Ed. 845
A. 0.2 to 0.4 %
B. 0.4 to 0.6 %
C. 0.6 to 0.8 %
D. 0.8 to 1.0 %

Normally, average RBC life span is 120 days. Thus, 0.8 - 1.0 % of red cells turn over each day.

263 Each milliliter of red cells contain how much elemental iron ?
Harrison's 18th Ed. 845
A. 1 mg
B. 2 mg
C. 3 mg
D. 4 mg

Each milliliter of red cells contains 1 mg of elemental iron.

264 Iron absorption takes place largely in ?
Harrison's 18th Ed. 845
A. Stomach
B. Proximal small intestine
C. Distal small intestine
D. Large intestine

Iron absorption takes place largely in proximal small intestine through a carefully regulated process.

265 Reduction of ferric (Fe³⁺) to ferrous (Fe²⁺) iron at brush border membrane of duodenal enterocytes is done by ?
Harrison's 17th Ed. 3163 Figure 357-1
A. Duodenal hepcidin
B. Duodenal ferroportin
C. Duodenal hephaestin
D. Duodenal cytochrome B (Dcytb)

Dietary inorganic iron traverses brush border membrane of duodenal enterocytes via DMT1 after reduction of ferric (Fe³⁺) to ferrous (Fe²⁺) iron by duodenal cytochrome B (Dcytb) - a ferrireductase.

266 Iron transport across the enteric absorptive cell membrane is accomplished by ?
Harrison's 18th Ed. 845
A. Duodenal cytochrome B (Dcytb)
B. Hephaestin
C. Ferroportin
D. Divalent metal transporter 1 (DMT-1)

Iron transport across enteric absorptive cell membrane is achieved by Divalent metal transporter 1 (DMT-1). DMT-1 is a general cation transporter and is also known as natural resistance macrophage-associated protein type 2 (Nramp 2) or DCT-1.

267 Iron in gut cell is transported through its basolateral surface to plasma transferrin through ?
Harrison's 18th Ed. 845
A. Duodenal cytochrome B (Dcytb)
B. Hephaestin
C. Ferroportin (FPN)
D. Divalent metal transporter 1 (DMT-1)

In gut cell, iron may be stored as ferritin or released at basolateral surface to plasma transferrin through membrane-embedded iron exporter, ferroportin (FPN).

268 Which of the following oxidizes iron to ferric form for transferrin binding at the basolateral surface of gut cell ?
Harrison's 18th Ed. 845
A. Duodenal cytochrome B (Dcytb)
B. Hephaestin
C. Ferroportin
D. Divalent metal transporter 1 (DMT-1)

Iron moves from enterocyte into circulation via a process requiring basolateral iron exporter ferroportin (FPN) & iron oxidase hephaestin (Heph) - which oxidizes iron to ferric form for transferrin binding.

269 Hephaestin is similar to which of the following ?

Harrison's 18th Ed. 845

- A. Ferritin
- B. Erythropoietin
- C. C-reactive protein
- D. Ceruloplasmin

Hephaestin is similar to ceruloplasmin, the copper-carrying protein.

270 Hepcidin is derived from ?

Harrison's 18th Ed. 849

- A. Bone marrow
- B. Liver
- C. Duodenum
- D. Spleen

Hepcidin is a 25-amino-acid peptide made by the liver.

271 Which of the following is called "iron regulatory hormone" ?

Harrison's 18th Ed. 845

- A. Ferritin
- B. Transferrin
- C. Erythropoietin
- D. Hepcidin

272 Hepcidin principally acts on which of the following ?

Harrison's 18th Ed. 845

- A. Duodenal cytochrome B (Dcytb)
- B. Hephaestin
- C. Ferroportin
- D. Divalent metal transporter 1 (DMT-1)

Hepcidin (principal iron regulatory hormone) is involved in regulation of iron uptake by enterocytes & iron release by RE cells. Hepcidin represses ferroportin at basolateral surface as well as iron release from macrophages & serves as a central regulator of body iron traffic. It is a crucial molecule in iron metabolism, linking body stores with intestinal iron absorption.

273 Hepcidin responds to signals mediated by ?

Harrison's 17th Ed. 3163 Figure 357-1

- A. HFE
- B. TfR2 (transferrin receptor 2)
- C. Hemojuvelin (HJV)
- D. All of the above

Hepcidin responds to changes in body iron requirements by signals mediated by HFE, TfR2 & hemojuvelin (HJV). Mutations in the genes encoding HFE, TfR2, hemojuvelin, and hepcidin lead to decreased hepcidin release and increased iron absorption, resulting in hemochromatosis.

274 Bone marrow iron stores are absent when serum ferritin level is ?

Harrison's 18th Ed. 846

- A. < 15 µg/L
- B. < 25 µg/L
- C. < 35 µg/L
- D. < 45 µg/L

Bone marrow iron stores are absent when the serum ferritin level is <15 µg/L.

275 Hemoglobin synthesis is impaired when transferrin saturation falls to ?

Harrison's 18th Ed. 846

- A. 10 to 15 %

B. 15 to 20 %

C. 20 to 25 %

D. 25 to 30 %

Once the transferrin saturation falls to 15 - 20%, hemoglobin synthesis becomes impaired. This is a period of iron-deficient erythropoiesis. When transferrin saturation is 10 - 15%, hemoglobin & hematocrit begin to fall, reflecting iron-deficiency anemia.

276 Which of the following about iron-deficient erythropoiesis is false ?

Harrison's 18th Ed. 846

- A. Impaired hemoglobin synthesis
- B. Microcytic RBCs first appear in PBF
- C. Hyperchromic reticulocytes in circulation
- D. Transferrin saturation between 15 to 20 %

When transferrin saturation is between 15 to 20%, hemoglobin synthesis is impaired. This is a period of iron-deficient erythropoiesis. Peripheral blood smear reveals the first appearance of microcytic cells and hypochromic reticulocytes in circulation.

277 Microcytic RBC's & hypochromic reticulocytes first appear in circulation in which of the following stages ?

Harrison's 18th Ed. 846

- A. Negative iron balance
- B. Iron-deficient erythropoiesis
- C. Iron-deficiency anemia
- D. All of the above

Hb synthesis is impaired in iron-deficient erythropoiesis and PBF shows microcytic RBCs and hypochromic reticulocytes.

278 Appearance of iron deficiency in an adult male means ?

Harrison's 18th Ed. 846

- A. Acute inflammation
- B. Chronic inflammation
- C. Gastrointestinal blood loss
- D. Blood malignancy

279 Iron deficiency in adult male usually means ?

Harrison's 18th Ed. 846

- A. Inadequate iron in diet
- B. Inadequate iron absorption
- C. Gastrointestinal blood loss
- D. All of the above

Aa a rule, iron deficiency in adult male means gastrointestinal blood loss until proved otherwise.

280 Which of the following is a sign of advanced tissue iron deficiency ?

Harrison's 18th Ed. 846

- A. Fatigue
- B. Pallor
- C. Reduced exercise capacity
- D. Cheilosis

Usual signs of iron deficiency anemia are fatigue, pallor & reduced exercise capacity. Cheilosis (fissures at corners of mouth) & koilonychia are signs of advanced tissue iron deficiency.

281 Normal range for serum iron is ?

Harrison's 18th Ed. 847

- A. 10 to 40 µg / dL
- B. 20 to 80 µg / dL

- C. 30 to 100 μg / dL
D. 50 to 150 μg / dL

282 Normal range for TIBC is ?*Harrison's 18th Ed. 847*

- A. 180 to 250 μg / dL
B. 300 to 360 μg / dL
C. 450 to 700 μg / dL
D. 750 to 1050 μg / dL

283 Normal Transferrin saturation is ?*Harrison's 18th Ed. 847*

- A. 12 to 18 %
B. 15 to 28 %
C. 25 to 50 %
D. 45 to 70 %

Normal range for serum iron is 50 - 150 $\mu\text{g}/\text{dL}$. Normal range for TIBC is 300 - 360 $\mu\text{g}/\text{dL}$.
Transferrin saturation is normally 25 - 50%.

284 Which of the following is the formula for calculating transferrin saturation ?*Harrison's 18th Ed. 847*

- A. $(\text{Serum iron} \times 100) \div \text{TIBC}$
B. $(\text{TIBC} \times 100) \div \text{Serum iron}$
C. $(\text{Serum iron} \div 100) \times \text{TIBC}$
D. $(\text{TIBC} \div 100) \times \text{Serum iron}$

Transferrin saturation is calculated by as serum iron $\times 100 \div \text{TIBC}$.

285 Iron deficiency states is present when transferrin saturation is below ?*Harrison's 18th Ed. 847*

- A. 6 %
B. 10 %
C. 14 %
D. 20 %

Iron-deficiency is associated with transferrin saturation levels < 20 %.

286 Serum iron level represents the amount of ?*Harrison's 18th Ed. 847*

- A. Circulating free iron
B. Circulating iron bound to transferrin
C. Circulating free iron + iron bound to transferrin
D. Any of the above

Serum iron level represents amount of circulating iron bound to transferrin.

287 Adult males have serum ferritin values averaging about ?*Harrison's 18th Ed. 847*

- A. 100 μg / L
B. 200 μg / L
C. 300 μg / L
D. 400 μg / L

288 Adult females have serum ferritin values averaging about ?*Harrison's 18th Ed. 847*

- A. 10 μg / L

- B. 20 μg / L
C. 30 μg / L
D. 40 μg / L

Serum ferritin level correlates with total body iron stores. Normal value for adult males & females average ~100 and 30 $\mu\text{g}/\text{L}$ respectively.

289 Sideroblasts have granules consisting of ?*Harrison's 18th Ed. 847*

- A. Ferritin
B. Transferrin
C. Glycogen
D. All of the above

290 Sideroblasts are ?*Harrison's 18th Ed. 847*

- A. Developing erythroblasts
B. Developing myeloblasts
C. Defective erythroblasts
D. Defective myeloblasts

291 Normal percentage of sideroblasts in bone marrow is ?*Harrison's 18th Ed. 847*

- A. 5 %
B. 10 %
C. 40 %
D. 75 %

292 In 'ringed sideroblasts', the accumulation of iron is around ?*Harrison's 18th Ed. 847*

- A. Cell membrane
B. Nucleus
C. Mitochondria
D. Endoplasmic reticulum

293 Sideroblastic anemia usually points to the diagnosis of ?*Harrison's 18th Ed. 847*

- A. Aplastic anemia
B. Myelodysplasia
C. Pernicious anemia
D. All of the above

Normally, in a bone marrow smear stained for iron, 20 - 40% of developing erythroblasts called sideroblasts are visible with ferritin granules in their cytoplasm. Ringed sideroblasts are seen in myelodysplastic syndromes due to mitochondrial dysfunction. Iron accumulates in mitochondria in a necklace fashion around the nucleus of erythroblast.

294 Normal value of red cell protoporphyrin is ?*Harrison's 18th Ed. 847*

- A. < 30 $\mu\text{g}/\text{dL}$
B. < 60 $\mu\text{g}/\text{dL}$
C. < 90 $\mu\text{g}/\text{dL}$
D. < 120 $\mu\text{g}/\text{dL}$

Normal value of red cell protoporphyrin is < 30 $\mu\text{g}/\text{dL}$. Most common causes of increased red cell protoporphyrin levels are absolute or relative iron deficiency and lead poisoning.

295 Which of the following is false about transferrin receptor protein (TRP) ?*Harrison's 18th Ed. 847*

- A Serum levels of TRP reflect total erythroid marrow mass
- B. TRP is released by erythroid cells into circulation
- C. TRP levels are elevated in absolute iron deficiency
- D. None of the above

Serum levels of transferrin receptor protein (TRP) is 4 - 9 µg/L. It along with serum ferritin, distinguishes between iron deficiency & anemia of chronic inflammation.

296 Which of the following is false about thalassemias ?

Harrison's 18th Ed. 847

- A Hypochromic microcytic anemia
- B. Normal or increased serum iron levels
- C. Normal or increased serum transferrin saturation
- D. Elevated red blood cell distribution width (RDW) index

Characteristics of thalassemia include hypochromic microcytic anemia, normal or increased serum iron levels & transferrin saturation with small RDW index which is elevated in iron deficiency.

297 Which of the following is false about anemia of chronic inflammation ?

Harrison's 18th Ed. 847

- A Normocytic and normochromic anemia
- B. Normal or increased serum ferritin levels
- C. Below normal serum transferrin saturation
- D. Normal TIBC

Anemia of chronic inflammation with inadequate iron supply is normocytic and normochromic. Ferritin level is normal or increased and percent transferrin saturation & TIBC are typically below normal.

298 Elemental iron per day for iron replacement therapy is ?

Harrison's 18th Ed. 848

- A ~ 30 mg
- B. ~ 100 mg
- C. ~ 200 mg
- D. ~ 300 mg

For iron replacement therapy, ~300 mg of elemental iron is given per day.

299 Ideally, oral iron preparations should be taken ?

Harrison's 18th Ed. 848

- A Empty stomach
- B. Just before a meal
- C. Along with meals
- D. Following meals

Since foods may inhibit oral iron absorption, iron preparations should be taken on empty stomach.

300 How many days after initiation of oral iron therapy, reticulocyte count begin to increase ?

Harrison's 18th Ed. 849

- A 4 - 7 days
- B. 7 - 14 days
- C. 14 - 21 days
- D. 21 - 28 days

Typically, reticulocyte count begin to increase within 4 - 7 days after initiation of oral iron therapy and peak at 1½ weeks.

301 In normal iron tolerance test, 2 hours after 2 iron tablets, serum iron increases by ?

Harrison's 18th Ed. 849

- A 10 µg / dL
- B. 500 µg / dL
- C. 75 µg / dL
- D. 100 µg / dL

In normal iron tolerance test, 2 hours after 2 iron tablets on an empty stomach, serum iron increases by at least 100 µg/dL indicating patient's ability to absorb iron adequately.

302 Amount of parenteral iron needed is calculated by ?

Harrison's 18th Ed. 849

- A Weight (kg) x 0.3 x (15 - patients Hb) + 500 or 1000 mg
- B. Weight (kg) x 1.3 x (15 - patients Hb) + 500 or 1000 mg
- C. Weight (kg) x 2.3 x (15 - patients Hb) + 500 or 1000 mg
- D. Weight (kg) x 3.3 x (15 - patients Hb) + 500 or 1000 mg

Amount of parenteral iron needed is calculated by weight (kg) x 2.3 x (15 - patients Hb in grams/dL) + 500 or 1000 mg (for stores).

303 Infusion of iron must be stopped immediately if which of the following develops ?

Harrison's 18th Ed. 849

- A Chest pain
- B. Wheezing
- C. Fall in blood pressure
- D. Any of the above

Early in the infusion of iron, if chest pain, wheezing, a fall in blood pressure, or other systemic symptoms occur, the infusion of iron should be stopped immediately.

304 Endogenous erythropoietin production is inadequate for the degree of anemia in ?

Harrison's 18th Ed. 849

- A Chronic inflammation
- B. Renal disease
- C. Hypometabolism
- D. All of the above

With chronic inflammation, renal disease, or hypometabolism, endogenous EPO production is inadequate for the degree of anemia observed.

305 Which of the following is a feature of anemia of chronic disease ?

Harrison's 18th Ed. 849

- A Increased red cell protoporphyrin
- B. Hypoproliferative marrow
- C. Normal or increased serum ferritin
- D. All of the above

Features of anemia of chronic disease are a low serum iron, increased red cell protoporphyrin, hypoproliferative marrow, transferrin saturation of 15 - 20%, & normal or increased serum ferritin.

306 Which of the following is the most distinguishing feature between true iron-deficiency anemia & iron-deficient erythropoiesis associated with inflammation ?

Harrison's 18th Ed. 849

- A Low serum iron
- B. Increased red cell protoporphyrin
- C. Normal or increased serum ferritin
- D. Hypoproliferative marrow

Serum ferritin level is the most distinguishing feature between true iron-deficiency anemia & iron-deficient erythropoiesis associated with inflammation which increase threefold over basal levels in inflammation due to effects of inflammatory cytokines & hepcidin.

307 A typical unit of packed RBC increases hemoglobin by ?*Harrison's 18th Ed. 851*

- A. 0.5 g / dL
- B. 0.75 g / dL
- C. 1 g / dL
- D. 1.25 g / dL

*A typical unit of packed red cells increases the hemoglobin level by 1 g/dL.***308 A unit of packed RBCs contains how much iron ?***Harrison's 18th Ed. 851*

- A. 25 to 30 mg
- B. 100 to 150 mg
- C. 150 to 250 mg
- D. 250 to 300 mg

309 Inadequate erythropoietin response is due to ?*Harrison's 18th Ed. 851*

- A. Iron depletion
- B. Aluminum toxicity
- C. Hyperparathyroidism
- D. All of the above

*A fall in Hb during EPO therapy signifies infection or iron depletion. Aluminum toxicity and hyperparathyroidism can also compromise EPO response.***310 Normal blood level of erythropoietin is ?***N Engl J Med 2006;354:2034-45*

- A. 10 mU per milliliter
- B. 20 mU per milliliter
- C. 30 mU per milliliter
- D. 40 mU per milliliter

*Normal blood level of erythropoietin is 20 mU per milliliter.***Chapter 104. Disorders of Hemoglobin****311 Hemoglobinopathies are disorders that affect which of the following parameters of hemoglobin ?***Harrison's 18th Ed. 852*

- A. Structure
- B. Function
- C. Production
- D. All of the above

*Hemoglobinopathies are disorders affecting the structure, function, or production of hemoglobin***312 The major adult hemoglobin, HbA, has the structure ?***Harrison's 18th Ed. 852*

- A. $\alpha_2\beta_2$
- B. $\alpha_2\gamma_2$
- C. $\alpha_2\delta_2$
- D. None of the above

313 Structure of HbF is ?*Harrison's 18th Ed. 852*

- A. $\alpha_2\beta_2$

- B. $\alpha_2\gamma_2$
- C. $\alpha_2\delta_2$
- D. None of the above

314 Structure of HbA₂ is ?*Harrison's 18th Ed. 852*

- A. $\alpha_2\beta_2$
- B. $\alpha_2\gamma_2$
- C. $\alpha_2\delta_2$
- D. None of the above

315 Which of the following about human hemoglobins is false ?*Harrison's 18th Ed. 852 Figure 104-1*

- A. α -like globin genes are on chromosome 16
- B. β -like globin genes on chromosome 11
- C. LCR controlling α globin gene is modulated by ATRX
- D. None of the above

*Gene clusters encoding human hemoglobins are alpha-like globin genes (on chromosome 16), and beta-like genes (on chromosome 11). Locus control region (LCR) LCR controlling the alpha-globin gene cluster is modulated by ATRX.***316 Which of the following is false ?***Harrison's 18th Ed. 852*

- A. Normal individual has four α globin genes
- B. Normal individual has two β globin genes
- C. γ and δ are β -like genes
- D. None of the above

*A normal individual has 4 α globin genes on short arm of chromosome 16 (two genes per chromosome - $\alpha\alpha/\alpha\alpha$) & two β globin genes on short arm of chromosome 11 (one per chromosome, or β/β). The β -like genes (γ & δ) are nearby on chromosome 11.***317 Heme consists of which of the following protoporphyrin ring ?***Harrison's 18th Ed. 852*

- A. IX
- B. X
- C. XI
- D. XII

*Each globin chain has a single heme moiety, consisting of a protoporphyrin IX ring complexed with a single iron atom in ferrous state (Fe^{2+}).***318 Every molecule of hemoglobin can transport how many oxygen molecules ?***Harrison's 18th Ed. 852*

- A. 1
- B. 2
- C. 3
- D. 4

*Each heme moiety can bind a single oxygen molecule. One molecule of hemoglobin can transport up to four oxygen molecules.***319 Severe fetal hydrops is related to which of the following ?**

- A. Ballantyne syndrome
- B. Mirror syndrome
- C. Triple oedema syndrome
- D. All of the above

Ballantyne syndrome is also known as mirror syndrome and Triple oedema syndrome.

320 Hemoglobin-oxygen dissociation curve is between percent saturation of Hb and ?

Harrison's 18th Ed. 853 Figure 104-2

- A. pH
- B. Tissue PO_2
- C. Alveolar PO_2
- D. Tissue PCO_2

Hemoglobin-oxygen dissociation curve is between percent saturation of Hb and tissue PO_2 .

321 Modulator of O_2 affinity of heme molecules is ?

Harrison's 18th Ed. 853 Figure 104-2

- A. 2,3-bisphosphoglycerate (2,3-BPG)
- B. pH
- C. Temperature
- D. CO_2

Blood pH is the most important modulator of O_2 affinity (Bohr effect).

322 Bohr effect is the ability of hemoglobin to deliver more oxygen to tissues at ?

Harrison's 18th Ed. 852

- A. Low pH
- B. Neutral pH
- C. High pH
- D. Any of the above

The Bohr effect is the ability of hemoglobin to deliver more oxygen to tissues at low pH.

323 In which week of gestation red cells first appear in foetus ?

Harrison's 18th Ed. 852

- A. About 2 weeks
- B. About 4 weeks
- C. About 6 weeks
- D. About 8 weeks

Red cells first appear at about 6 weeks after conception.

324 Which of the following is an embryonic hemoglobin ?

Harrison's 18th Ed. 852

- A. Hb Portland
- B. Hb Gower I
- C. Hb Gower II
- D. All of the above

Embryonic hemoglobins are Hb Portland, Hb Gower I and Hb Gower II.

325 In which week of gestation does fetal hemoglobin become predominant ?

Harrison's 18th Ed. 852

- A. About 6 weeks
- B. About 10 weeks
- C. About 18 weeks
- D. About 24 weeks

At 10 - 11 weeks, fetal hemoglobin (HbF) becomes predominant.

326 Almost exclusive synthesis of adult hemoglobin (HbA) in foetus occurs at about ?

Harrison's 18th Ed. 852

- A. 28 weeks
- B. 30 weeks
- C. 34 weeks
- D. 38 weeks

Nearly exclusive synthesis of adult hemoglobin (HbA) occurs at ~38 weeks.

327 When mutations alter the amino acid sequence of a globin chain, which of the following hemoglobinopathies occur ?

Harrison's 18th Ed. 852

- A. Structural hemoglobinopathies
- B. Thalassemia syndromes
- C. Hereditary persistence of fetal hemoglobin (HPFH)
- D. Acquired hemoglobinopathies

Structural hemoglobinopathies occur when mutations alter the amino acid sequence of a globin chain thereby altering physiologic properties of the variant hemoglobins (sickle cell anemia - the most common structural hemoglobinopathy).

328 When mutations impair production or translation of globin mRNA, which of the following hemoglobinopathies occur ?

Harrison's 18th Ed. 853

- A. Structural hemoglobinopathies
- B. Thalassemia syndromes
- C. Hereditary persistence of fetal hemoglobin (HPFH)
- D. Acquired hemoglobinopathies

Thalassemia syndromes arise from mutations that impair production or translation of globin mRNA, leading to deficient globin chain biosynthesis.

329 Which of the following statements about hemoglobinopathies is false ?

Harrison's 18th Ed. 853

- A. Common in malaria endemic areas
- B. Thalassemia children more susceptible to infection with nonlethal *Plasmodium vivax*
- C. Thalassemia naturally protects against infection with *Plasmodium falciparum*
- D. None of the above

330 Which of the following is not a characteristic of Sickle Cell Syndromes ?

Harrison's 18th Ed. 854

- A. Microvascular vasoocclusion
- B. Premature RBC destruction
- C. Stiff RBC membrane
- D. None of the above

331 In sickle cell syndrome, HbS is best illustrated as ?

Harrison's 18th Ed. 854

- A. $\alpha_2\beta_2^3$ Glu→Val
- B. $\alpha_2\beta_2^4$ Glu→Val
- C. $\alpha_2\beta_2^5$ Glu→Val
- D. $\alpha_2\beta_2^6$ Glu→Val

The sickle cell syndromes are caused by a mutation in the beta-globin gene that changes the sixth amino acid from glutamic acid to valine. Whereas thalassemias are caused by gene mutations resulting in decreased production of α or β globin chains, the sickle cell disorders are hemoglobinopathies caused by mutations in the β globin gene resulting in the production of a structurally abnormal β globin chain.

332 HbC is best illustrated as ?*Harrison's 18th Ed. 854*

- A. $\alpha_2\beta_2^3$ Glu→Lys
 B. $\alpha_2\beta_2^4$ Glu→Lys
 C. $\alpha_2\beta_2^5$ Glu→Lys
 D. $\alpha_2\beta_2^6$ Glu→Lys

333 Hand-foot syndrome is related to which of the following ?*Harrison's 18th Ed. 854*

- A. Tietze Syndrome
 B. Hypertrophic Osteoarthropathy
 C. Sickle cell disease
 D. Syringomyelia

Sickle cell dactylitis or hand-foot syndrome caused by painful infarcts of digits & dactylitis is seen in sickle cell disease & sickle cell thalassemia below the age 4 or 5 years & not in adults.

334 Bone pain in sickle cell crisis is due to ?*Harrison's 18th Ed. 2854*

- A. Fracture
 B. Bone & bone marrow infarction
 C. Hyperuricemia
 D. Osteoporosis

The bone pain in sickle cell crisis is due to bone and bone marrow infarction.

335 Which of the following is useful in the treatment of sickle cell disease ?*Harrison's 18th Ed. 857*

- A. Anagrelide
 B. Danazol
 C. IFN-alpha
 D. Hydroxyurea

Hydroxyurea (10 - 30 mg/kg per day) increases fetal hemoglobin, has favourable effects on RBC hydration, vascular wall adherence, and suppresses granulocyte & reticulocyte counts.

336 Which of the following drugs may elevate HbF ?*Harrison's 18th Ed. 857*

- A. Hydroxyurea
 B. 5-azacytidine
 C. 5-deoxyazacytidine (decitabine)
 D. All of the above

Antitumor drug 5-azacytidine was the first agent found to elevate HbF. Its widespread use has been prevented because of concerns about acute toxicity & carcinogenesis. Low doses of 5-deoxyazacytidine (decitabine) can elevate HbF with more acceptable toxicity.

337 Muddy appearance of freshly drawn blood is characteristic of which of the following ?*Harrison's 18th Ed. 857*

- A. Sickle cell anemia
 B. Methemoglobinemia
 C. Thalassemia
 D. All of the above

Muddy appearance of freshly drawn blood is characteristic of Methemoglobinemia.

338 Which of the following facies is typical of thalassemia ?*Harrison's 18th Ed. 859*

- A. Plethoric moon facies

- B. Leonine facies
 C. Chipmunk facies
 D. Elfin facies

In thalassemic children, characteristic "chipmunk" facies occurs due to maxillary marrow hyperplasia & frontal bossing.

339 In α -thalassemia-2 trait, how many of the four α -globin loci are deleted ?*Harrison's 18th Ed. 859*

- A. 1
 B. 2
 C. 3
 D. 4

340 In α -thalassemia-1 trait, how many of the four α -globin loci are deleted ?*Harrison's 18th Ed. 859*

- A. 1
 B. 2
 C. 3
 D. 4

341 In hydrops fetalis with Hb Bart's, how many of the four α -globin loci are deleted ?*Harrison's 18th Ed. 859*

- A. 1
 B. 2
 C. 3
 D. 4

342 In HbH disease, how many of the four α -globin loci are deleted ?*Harrison's 18th Ed. 859*

- A. 1
 B. 2
 C. 3
 D. 4

The four classic α thalassemias are α -thalassemia-2 trait (one of the four α -globin loci is deleted), α -thalassemia-1 trait (with two deleted loci), HbH disease (with three loci deleted) and hydrops fetalis with Hb Bart's (all four loci deleted).

343 Which of the following α -thalassemia resembles β -thalassemia minor ?*Harrison's 18th Ed. 859*

- A. α -thalassemia-1 trait
 B. α -thalassemia-2 trait
 C. HbH disease
 D. Hydrops fetalis with Hb Bart's

α -thalassemia-1 trait resembles β -thalassemia minor. α -thalassemia-2 trait is an asymptomatic, silent carrier state.

344 Hb Barts is designated as ?*Harrison's 18th Ed. 859*

- A. α_4
 B. β_4
 C. γ_4
 D. δ_4

Hb Barts is designated as γ_4

345 Which of the following is not a feature of thalassemia ?

Harrison's 17th Ed. 2179

- A. Avascular necrosis
- B. Osteomalacia
- C. Osteopenia
- D. Microfractures

Avascular necrosis is not a feature of thalassemia because there is no sickling of red cells leading to thrombosis and infarction.

346 In sickle cell disease, presence of palpable spleen after what age suggests a coexisting thalassemia ?

Harrison's 17th Ed. 375

- A. 5 years
- B. 10 years
- C. 15 years
- D. 20 years

Presence of a palpable spleen in sickle cell disease after age 5 years suggests a coexisting hemoglobinopathy like thalassemia.

347 Which of the following is a cause of microcytic erythrocytosis ?

Harrison's 17th Ed. 673

- A. Thalassemia trait
- B. Hypoxic erythrocytosis
- C. Polycythemia vera (PV)
- D. All of the above

Only 3 conditions cause microcytic erythrocytosis - thalassemia trait, hypoxic erythrocytosis & PV. RDW is normal in beta-thalassemia, while it is elevated in hypoxic erythrocytosis & PV.

348 Target cells in PBF can be seen in which of the following conditions ?

Harrison's 17th Ed. Chapter 203

- A. Thalassemia
- B. Iron deficiency
- C. Cholestatic liver disease
- D. All of the above

Target cells (area of central pallor with dense center or bull's eye) is typical of thalassemia, but can be seen in iron deficiency, cholestatic liver disease or as an artifact. Larger numbers are typical of hemoglobin C disease.

349 Geographic distributions of which of the following closely resemble that of malaria ?

Harrison's 17th Ed. Chapter 203

- A. Sickle cell disease
- B. Thalassemia
- C. Glucose-6-phosphate dehydrogenase (G6PD) deficiency
- D. All of the above

Geographic distributions of sickle cell disease, ovalocytosis, thalassemia, and glucose-6-phosphate dehydrogenase (G6PD) deficiency closely resemble that of malaria

350 Which of the following is normal or increased in thalassemia ?

Harrison's 17th Ed. 631

- A. Serum iron level
- B. Transferrin saturation
- C. Serum ferritin level
- D. All of the above

Normal or increased serum iron & ferritin levels and transferrin saturation are characteristic of the thalassemias.

351 Cooley's anemia refers to ?

- A. Beta thalassemia minor
- B. Beta thalassemia intermedia
- C. Beta thalassemia major
- D. Any of the above

In β -thalassemia, the β globin chains are structurally normal but quantitatively reduced.

352 Variant hemoglobins that may be co-inherited with β -thalassemia are ?

- A. Hemoglobin S
- B. Hemoglobin E
- C. Hemoglobin C
- D. All of the above

Variant hemoglobins that may be co-inherited with β -thalassemia are Hemoglobin S, Hemoglobin E and Hemoglobin C.

353 Which of the following is referred to as a "thalassemic hemoglobinopathy" ?

- A. Hemoglobin S
- B. Hemoglobin E
- C. Hemoglobin C
- D. All of the above

Hemoglobin E is referred to as a "thalassemic hemoglobinopathy" because in addition to being structurally abnormal it is produced in reduced quantities. Patient who inherits a HbE mutation from one parent and a β -thalassemia mutation from another (HbE/ β -thalassemia) will clinically be similar to a patient with β -thalassemia intermedia or major.

354 Features of thalassemia include all except ?

N Engl J Med 2005;353:1135-46

- A. Hypopituitarism
- B. Hypogonadism
- C. Hypoparathyroidism
- D. Diabetes insipidus

355 Features of thalassemia include all except ?

N Engl J Med 2005;353:1135-46

- A. Cardiomyopathy
- B. Excessive melanin skin pigmentation
- C. Pulmonary fibrosis
- D. Diabetes mellitus

356 Which of the following about Hepcidin is false ?

N Engl J Med 2005;353:1135-46

- A. Inhibits iron absorption in small bowel
- B. Levels increase when iron stores are elevated
- C. Levels are high in patients with thalassemia major
- D. Also called "Storage iron regulator"

Hepcidin is a small peptide that inhibits iron absorption in small bowel. Hepcidin levels normally increase when iron stores are elevated. Hepcidin levels are inappropriately low in thalassemia intermedia & thalassemia major.

357 Which of the following findings rules out thalassemia and no additional thalassemia testing is required ?

- A. MCV > 80 fL, MCH > 27 pg, normal Hb electrophoresis
- B. MCV > 90 fL, MCH > 27 pg, normal Hb electrophoresis
- C. MCV > 100 fL, MCH > 27 pg, normal Hb electrophoresis

- D. MCV > 110 fL, MCH > 27 pg, normal Hb electrophoresis

The finding of a normal MCV (≥ 80 fL) with normal MCH (≥ 27 pg) and normal Hb electrophoresis or HPLC rules out most cases of thalassemia and requires no additional thalassemia testing.

358 Patients with β -thalassemia trait have an elevated HbA2 of ?

- A. > 0.5 %
B. > 1.5 %
C. > 2.5 %
D. > 3.5 %

Patients with β -thalassemia trait have an elevated HbA2 of > 3.5 %.

359 Which of the following is not applicable for estimating iron overload in thalassemia patients ?

N Engl J Med 2005;353:1135-46

- A. Serum ferritin
B. Magnetic susceptometry (SQUID)
C. Labile plasma iron estimation
D. CT of liver

360 A unit (250-300 ml) of packed RBCs contains how much iron ?

Harrison's 18th Ed. 860

- A. 50 - 100 mg
B. 100 - 150 mg
C. 150 - 250 mg
D. 250 - 300 mg

A unit (250-300 ml) of packed RBCs contains 250 - 300 mg of iron (1 mg/mL).

361 Patients develop hemosiderosis after how many units of packed RBCs ?

Harrison's 18th Ed. 860

- A. > 50 units
B. > 100 units
C. > 200 units
D. > 500 units

Patients who receive >100 units of packed RBCs usually develop hemosiderosis.

362 Which of the following is not an oral iron-chelating agent ?

N Engl J Med 2005;353:1135-46

- A. Deferoxamine
B. Deferiprone
C. Deferasirox
D. None of the above

Deferoxamine is iron-chelating agent & requires parenteral administration.

363 Which of the following promotes high levels of HbF synthesis ?

Harrison's 18th Ed. 861

- A. Hydroxyurea
B. Butyrate
C. Cytarabine
D. All of the above

Reestablishing high levels of HbF synthesis can ameliorate symptoms of thalassemia. Hydroxyurea & cytarabine promote high levels of HbF synthesis by stimulating proliferation of F cell progenitors. Butyrate also stimulate HbF production.

364 Lucarelli classification is used to classify ?

N Engl J Med 2005;353:1135-46

- A. Porphyria
B. Hemolytic anemia
C. Thalassemia
D. Anemia

Lucarelli classification assess risk factors that predict outcome & prognosis in thalassemia.

365 Which of the following should be avoided in an iron excess state ?

Harrison's 18th Ed. 861

- A. Vitamin C
B. Vitamin E
C. Folic acid
D. Plant flavonoids

Vitamin C should not be supplemented in iron excess states because it generates free radicals.

366 Heinz bodies is best related to ?

N Engl J Med 2005;353:1135-46

- A. Precipitates of unpaired β globin chains
B. Precipitates of unpaired α globin chains
C. Precipitates of unpaired α & β globin chains
D. Any of the above

Precipitates of unpaired β chains form single large inclusions known as Heinz bodies.

367 Which parameter in fetal ultrasound is used to assess risk of hemoglobin Bart's hydrops fetalis ?

- A. Abdominal circumference
B. Nuchal translucency
C. Cardiothoracic ratio
D. Ventricular system of fetal brain

Cardiothoracic ratio in fetal ultrasound is used to assess risk of hemoglobin Bart's hydrops fetalis (normal < 0.53).

368 Estimated 5-year survival rate following allogeneic bone marrow transplantation is ?

Harrison's 18th Ed. 861

- A. 30 %
B. 50 %
C. 70 %
D. 90 %

Estimated 5-year survival rate following allogeneic bone marrow transplantation is 90% if done before they develop hepatomegaly or portal fibrosis and if given adequate iron chelation therapy.

Chapter 105. Megaloblastic Anemias

369 Element found at the center of corrin ring in cobalamin is ?

Harrison's 18th Ed. 862

- A. Copper
B. Cadmium
C. Cobalt
D. Calcium

All forms of Cobalamin (vit. B₁₂) have a cobalt atom at the center of corrin ring.

370 Which form of cobalamin is present in human plasma & in cell cytoplasm ?

Harrison's 18th Ed. 862

- A. Cobalamin
- B. Methylcobalamin
- C. Hydroxocobalamin
- D. Adocobalamin

Cobalamin (vitamin B₁₂) exists in a number of different chemical forms. Methylcobalamin is the form of cobalamin in human plasma & in cell cytoplasm.

371 Methylcobalamin is the cofactor for ?

Harrison's 18th Ed. 862

- A. Cystathionine synthase
- B. Methionine synthase
- C. Serine - glycine hydroxymethylase
- D. All of the above

Methylcobalamin is the cofactor for methionine synthase.

372 Which of the following about cobalamin is false ?

Harrison's 18th Ed. 862

- A. Copper atom is situated within a corrin ring
- B. Cannot be synthesized in human body
- C. Only dietary source is animal products
- D. Daily requirement is ~ 1 - 3 µg

Cobalamin is a complex organometallic compound in which a "cobalt" atom is situated within a corrin ring. It cannot be synthesized in human body & must be supplied in diet of animal products (meat, fish, and dairy products). Daily requirement for cobalamin is ~ 1 - 3 µg.

373 Body stores of cobalamin can suffice for how many years after supplies are completely cut off ?

Harrison's 18th Ed. 862

- A. 1 to 2 years
- B. 2 to 3 years
- C. 3 to 4 years
- D. 5 to 7 years

Body stores of 2 - 3 mg are sufficient for 3 - 4 years if supplies are completely cut off essentially due to enterohepatic cycle & size of liver stores. There is a permanent liver reserve of 1 mg.

374 Deficiency of cobalamin is almost always due to ?

Harrison's 18th Ed. 862

- A. Dietary deficiency
- B. Malabsorption
- C. Alcohol abuse
- D. Specific congenital enzyme deficiencies

Dietary intake of cobalamin is more than adequate for body's requirements, except in complete vegetarians & their breast-fed infants. Deficiency of cobalamin is almost always due to malabsorption.

375 Normal active physiologic mechanism of cobalamin absorption occurs in ?

Harrison's 18th Ed. 862

- A. Buccal mucosa
- B. Duodenal mucosa
- C. Ileal mucosa
- D. All of the above

Cobalamin absorption can be passive through buccal, duodenal & ileal mucosa. More efficient normal physiologic active mechanism is through ileum mediated by gastric intrinsic factor (IF).

376 Which of the following is a family of cobalamin-binding proteins ?

Harrison's 18th Ed. 862

- A. Glucocorrins
- B. Enterocorrins
- C. Haptocorrins
- D. All of the above

Dietary cobalamin combines rapidly with a salivary glycoprotein that belongs to the family of cobalamin-binding proteins known as haptocorrins (HCs).

377 In intestine, haptocorrin is digested by which of the following enzyme ?

Harrison's 18th Ed. 862

- A. Pancreatic trypsin
- B. Pancreatic amylase
- C. Pancreatic lipase
- D. Pancreatic colipase

In intestine, haptocorrin is digested by pancreatic trypsin to release cobalamin which is transferred to IF.

378 IF is produced in ?

Harrison's 18th Ed. 862

- A. Gastric parietal cells
- B. Gastric chief cells
- C. Gastric endocrine cells
- D. Gastric enterochromaffin cells

IF is produced in the acid-secreting gastric parietal cells located in oxyntic gland of fundus & body of stomach. Its secretion parallels that of hydrochloric acid.

379 Name of the receptor that mediates intestinal absorption of cobalamin-IF complex is ?

Harrison's 18th Ed. 862

- A. Spirulin
- B. Humulin
- C. Cubulin
- D. Cobalin

Cubulin is a specific receptor on microvillus membrane of enterocytes. IF-cobalamin attaches to it and enters the ileal cell, where IF is destroyed..

380 Endocytic receptor protein related to cubulin is ?

Harrison's 18th Ed. 862

- A. Amnionless (AMN)
- B. Leptin receptor
- C. Asialo-GM1
- D. Glycophorin A

Cubulin acts through amnionless (AMN), an endocytic receptor protein that directs sublocalization and endocytosis of cubulin with its ligand IF-cobalamin complex.

381 Cubilin also is present in ?

Harrison's 18th Ed. 862

- A. Cardiomyocyte
- B. Renal proximal tubular epithelium
- C. Islet of Langerhans
- D. All of the above

Cubilin also is present in yolk sac and renal proximal tubular epithelium.

382 Gastric R binder is found in which of the following secretions ?

Harrison's 16th Ed. 602

- A. Saliva
- B. Gastric juice
- C. Bile
- D. All of the above

Cobalamin in food is released and forms a stable complex with gastric R binder that is found in secretions like saliva, milk, gastric juice and bile.

383 Intrinsic factor (IF) catalyzes the conversion ?

Harrison's 16th Ed. 602

- A. Methionine to homocysteine
- B. Homocysteine to methionine
- C. Serine to glycine
- D. Glycine to serine

On entering the duodenum, the cobalamin-R binder complex is digested, releasing the cobalamin, which then binds to intrinsic factor (IF), a 50-kDa glycoprotein which catalyzes the conversion of homocysteine to methionine.

384 Most circulating cobalamin is bound to ?

Harrison's 18th Ed. 862

- A. Gastric R binder
- B. Transcobalamin (TC) I
- C. Transcobalamin (TC) II
- D. Intrinsic factor (IF)

TC I is derived from specific granules in neutrophils. Normally, it is ~ two-thirds saturated with cobalamin, which it binds tightly. TC I does not enhance cobalamin entry into tissues.

385 Which of the following is not related to "absorption" of cobalamin in humans ?

Harrison's 18th Ed. 862

- A. Gastric R binder
- B. Intrinsic factor (IF)
- C. Transcobalamin (TC) I
- D. Transcobalamin (TC) II

Two main cobalamin transport proteins in human plasma are TC I & TC II. TC II carries cobalamin in plasma & gives up cobalamin to marrow, placenta, and other tissues.

386 The common name for pteroylmonoglutamic acid is ?

Harrison's 18th Ed. 863

- A. Folic acid
- B. Vitamin B₁₂
- C. Ascorbic acid
- D. Pyridoxine

Folic acid is the common name for pteroylmonoglutamic acid.

387 Which of the following is primary dietary source of folic acid ?

Harrison's 18th Ed. 863

- A. Fruits and vegetables
- B. Eggs
- C. Milk
- D. Meat

Fruits and vegetables are the primary dietary source of folic acid. Folate concentrations is highest in liver, yeast, spinach, other greens, and nuts.

388 Which of the following is the major body store of folic acid ?

Harrison's 18th Ed. 863

- A. Liver
- B. Bone marrow
- C. Spleen
- D. Kidney

Total-body folate in the adult is ~10 mg, liver containing the largest store.

389 Normally, minimum daily requirement of folic acid is about ?

Harrison's 18th Ed. 863

- A. 100 µg
- B. 200 µg
- C. 300 µg
- D. 400 µg

Daily requirement is normally about 100 µg, but this may be increased several fold during periods of enhanced metabolic demand such as pregnancy, infancy, malignancy, increased hematopoiesis (chronic hemolytic anemias), chronic exfoliative skin disorders, hemodialysis.

390 Body stores of folate can suffice for how many months after supplies are completely cut off ?

Harrison's 18th Ed. 863

- A. 1 to 2 months
- B. 2 to 3 months
- C. 3 to 4 months
- D. 5 to 7 months

Total-body folate in adult is ~100 mg. Daily adult requirement is ~100 µg, so stores are sufficient for 3 - 4 months, if severe folate deficiency develops rapidly.

391 Site of absorption of Folic acid is ?

Harrison's 18th Ed. 863

- A. Stomach
- B. Proximal jejunum
- C. Terminal Ileum
- D. Colon

Folates in food are largely conjugated to a chain of glutamic acid residues which impair its intestinal absorption. Conjugases (γ-glutamyl carboxypeptidases) in gut lumen convert polyglutamates to mono- & di-glutamates, which are readily absorbed in proximal jejunum.

392 All dietary folates are converted to which of the following before entering portal plasma?

Harrison's 18th Ed. 863

- A. N⁵-methyltetrahydrofolate
- B. N¹⁰-methyltetrahydrofolate
- C. N¹⁵-methyltetrahydrofolate
- D. N²⁰-methyltetrahydrofolate

Plasma folate is primarily in the form of N⁵-methyltetrahydrofolate. All dietary folates are converted to 5-methyl THF (5-MTHF) within small-intestinal mucosa before entering portal plasma.

393 N⁵-methyltetrahydrofolate is a type of ?

Harrison's 18th Ed. 863

- A. Monoglutamate
- B. Diglutamate
- C. Triglutamate
- D. Polyglutamate

N⁵-methyltetrahydrofolate is a monoglutamate.

- 394 The prime function of folate compounds is ?**
Harrison's 18th Ed. 863
- A To transfer single-carbon moieties to organic compounds
 - B Factor for methionine synthase & methylmalonyl coenzyme A (CoA) synthase
 - C Conversion of methylmalonyl CoA to succinyl CoA
 - D Conversion of succinyl CoA to methylmalonyl CoA

Primary function of folate compounds is to transfer single carbon moieties such as methyl and formyl groups to various organic compounds. The sources of these 1-carbon moieties is usually serine which reacts with tetrahydrofolate to produce glycine and N^{5,10} methylenetetrahydrofolate.

- 395 Gamma-glutamyl carboxypeptidases in gut lumen convert ?**
Harrison's 16th Ed. 601
- A Polyglutamates to mono & diglutamates
 - B Diglutamates to monoglutamates
 - C Polysaccharides to mono and disaccharides
 - D Disaccharides to monosaccharides

Conjugases (γ-glutamyl carboxypeptidases) in the gut lumen convert polyglutamates to mono- and diglutamates, which are readily absorbed in the proximal jejunum.

- 396 Folate is essential for the de-novo synthesis of ?**
Harrison's 16th Ed. 602
- A Purines
 - B Deoxythymidylate monophosphate (dTMP)
 - C Methionine
 - D All of the above

Folate is essential for the de novo synthesis of purines, deoxythymidylate monophosphate (dTMP), and methionine, serving as an intermediate carrier of 1-carbon fragments used in the biosynthesis of these compounds.

- 397 Active form of folic acid is ?**
Harrison's 16th Ed. 602
- A Dihydrofolate
 - B Trihydrofolate
 - C Tetrahydrofolate
 - D Pentahydrofolate

Active form of folate is tetrahydrofolate (THF).

- 398 Folate coenzymes are essential in which of the following biochemical reactions ?**
Harrison's 18th Ed. 863 Table 105–2
- A Purine synthesis
 - B Pyrimidine synthesis
 - C Serine - glycine interconversion
 - D All of the above

Folate coenzymes are essential in Formate activation, Purine synthesis (formation of glycinamide ribonucleotide and formylation of aminoimidazole carboxamide ribonucleotide (AICAR), Pyrimidine synthesis (Methylation of deoxyuridine monophosphate (dUMP) to thymidine monophosphate (dTMP), Amino acid interconversion (serine - glycine interconversion, homocysteine to methionine and forminoglutamic acid to glutamic acid in histidine catabolism).

- 399 Which of the following drugs inhibit DHF reductase ?**
Harrison's 18th Ed. 863
- A Methotrexate
 - B Pyrimethamine
 - C Trimethoprim

D. All of the above

5,10-methylene-THF is oxidized to DHF (dihydrofolate). Enzyme DHF reductase converts DHF to THF. Methotrexate, pyrimethamine, and trimethoprim inhibit DHF reductase that prevents formation of active THF coenzymes from DHF.

- 400 Which of the following about megaloblastic anemias is false ?**
Harrison's 17th Ed. 645
- A Caused by impaired DNA synthesis
 - B Hematopoietic precursors & GI epithelial cells affected
 - C Megaloblastic cells have increased DNA to RNA ratio
 - D Ineffective erythropoiesis

Megaloblastic anemias are caused by impaired DNA synthesis in cells with rapid turnover like hematopoietic precursors & gastrointestinal epithelial cells. Cell division becomes sluggish but cytoplasmic development progresses normally, so megaloblastic cells tend to be large, with an increased ratio of RNA to DNA. Megaloblastic erythroid progenitors are destroyed in marrow whose cellularity is increased but production of RBC is decreased (ineffective erythropoiesis).

- 401 In deficiencies of either folate or cobalamin, there is failure to convert ?**
Harrison's 18th Ed. 864
- A dUMP to dTMP
 - B dTMP to dUMP
 - C dUMP to dUTP
 - D dUTP to dUMP

In deficiencies of either folate or cobalamin, there is failure to convert deoxyuridine monophosphate (dUMP) to deoxythymidine monophosphate (dTMP), the precursor of dTTP because folate is needed as the coenzyme 5,10-methylene - THF polyglutamate for conversion of dUMP to dTMP.

- 402 Which of the following is a cobalamin-requiring reaction ?**
Harrison's 16th Ed. 602
- A Purines synthesis
 - B Deoxythymidylate monophosphate (dTMP) synthesis
 - C Methionine synthesis
 - D All of the above

THF acquires 1-carbon fragment from serine which is converted to glycine. For purine synthesis, the 1-carbon fragment is first oxidized to the level of formic acid, then transferred to substrate. For methionine synthesis, a cobalamin-requiring reaction, the 1-carbon fragment is first reduced to the level of a methyl group, then transferred to homocysteine. In these reactions the cofactor is released as THF, which can immediately participate in another 1-carbon transfer cycle. During the production of dTMP from dUMP, the 1-carbon fragment is reduced from formaldehyde to a methyl group during transfer reaction. Hydrogen atoms used for this reduction come from the cofactor, which is released, not as THF, but as dihydrofolate (DHF). To participate further in the 1-carbon transfer cycle, DHF has to be re-reduced to THF, a reaction catalyzed by dihydrofolate reductase.

- 403 Methylmalonyl CoA isomerization requires which of the following ?**
Harrison's 18th Ed. 864
- A Adocobalamin
 - B Methylcobalamin
 - C 5-MTHF
 - D All of the above

Methylmalonyl CoA isomerization requires adocobalamin, and the methylation of homocysteine to methionine requires both methylcobalamin and 5-MTHF.

- 404 Which of the following abnormalities of folate metabolism occur in cobalamin deficiency ?**
Harrison's 18th Ed. 864
- A High serum folate
 - B Low cell folate
 - C Positive purine precursor aminoimidazole carboxamide ribonucleotide (AICAR) excretion

- D. All of the above

Abnormalities of folate metabolism that occur in cobalamin deficiency include high serum folate, low cell folate and positive purine precursor aminoimidazole carboxamide ribonucleotide (AICAR) excretion.

405 Which of the following statements about megaloblastic anemia due to folate deficiency is true ?

Harrison's 16th Ed. 606

- A. Raised serum methylmalonic acid, elevated homocysteine
- B. Reduced serum methylmalonic acid, reduced homocysteine
- C. Normal serum methylmalonic acid, reduced homocysteine
- D. Normal serum methylmalonic acid, elevated homocysteine

406 Which of the following statements about megaloblastic anemia due to cobalamin deficiency is true ?

Harrison's 16th Ed. 606

- A. Raised serum methylmalonic acid, elevated homocysteine
- B. Reduced serum methylmalonic acid, reduced homocysteine
- C. Raised serum methylmalonic acid, reduced homocysteine
- D. Reduced serum methylmalonic acid, elevated homocysteine

407 Most frequently affected tissues in cobalamin and folate deficiencies is ?

Harrison's 18th Ed. 865

- A. Epithelial cell surfaces of the mouth
- B. Bone marrow
- C. Peripheral nerves
- D. Epithelial cell surfaces of the small intestine

Most frequently affected tissue in cobalamin and folate deficiencies is the bone marrow followed by the epithelial cell surfaces of the mouth, stomach, and small intestine and the respiratory, urinary, and female genital tracts.

408 What dose of folic acid provides protective effect against Neural Tube Defects (NTDs) at conception ?

Harrison's 18th Ed. 865, 871

- A. 0.1 mg daily
- B. 0.2 mg daily
- C. 0.3 mg daily
- D. 0.4 mg daily

0.4 mg daily of folic acid provides protective effect against NTDs at conception. Folic acid (400 µg daily, should be given as a supplement before and throughout pregnancy. In women who have had a previous fetus with a neural tube defect, 5 mg daily is recommended when pregnancy is contemplated and throughout the subsequent pregnancy.

409 To prevent neural tube defects, folic acid supplements must be started at ?

Harrison's 18th Ed. 865

- A. Conception
- B. First 4 weeks of pregnancy
- C. First 8 weeks of pregnancy
- D. First 12 weeks of pregnancy

To prevent neural tube defects, folic acid supplements must be started at the time of conception and in the first 12 weeks of pregnancy. It reduces the incidence of neural tube defects (NTDs) (anencephaly, meningomyelocele, encephalocele, and spina bifida) in the fetus by 70%.

410 In NTD fetuses, which of the following maternal folate metabolic abnormality has been identified ?

Harrison's 18th Ed. 865

- A. Mutations in methionine synthase

- B. Mutations in serine - glycine hydroxymethylase

- C. Autoantibodies to folate receptors

- D. Reduced activity of 5,10-methylene-THF reductase (MTHFR)

In NTD fetuses, reduced activity of the enzyme 5,10-methylene-THF reductase (MTHFR) has been identified as the maternal folate metabolic abnormality.

411 Deficiency of which of the following enzymes can cause homocystinuria ?

Harrison's 18th Ed. 865, 869

- A. Methionine synthase
- B. MTHFR
- C. Cystathionine synthase
- D. All of the above

Severe homocystinuria may be due to deficiency of methionine synthase, MTHFR, or cystathionine synthase. Homocystinuria is a rare metabolic defect in the conversion of homocysteine to cystathionine. Folate deficiency is due to excessive utilization because of compensatory increased conversion of homocysteine to methionine.

412 Individuals with which of the following enzyme deficiency have an increased risk of vascular disease ?

Harrison's 18th Ed. 865

- A. Methionine synthase
- B. MHTFR
- C. Cystathionine synthase
- D. All of the above

Children with deficiency of enzyme methionine synthase, MHTFR or cystathionine synthase have an increased risk of vascular disease.

413 Meta-analysis has suggested that folic acid supplementation reduces the risk of stroke by ?

Harrison's 18th Ed. 865

- A. 4 %
- B. 8 %
- C. 18 %
- D. 25 %

Meta-analysis has suggested that folic acid supplementation reduces the risk of stroke by 18%.

414 Prophylactic folic acid in pregnancy reduces subsequent incidence of which of the following ?

Harrison's 18th Ed. 865

- A. Acute lymphoblastic leukemia (ALL)
- B. Hodgkin's lymphoma
- C. Astrocytoma
- D. Hemangioma

Prophylactic folic acid in pregnancy reduces the subsequent incidence of acute lymphoblastic leukemia (ALL) in childhood.

415 Clinical features of cobalamin deficiency involve which of the following ?

Harrison's 16th Ed. 603

- A. Blood
- B. Gastrointestinal tract
- C. Nervous system
- D. All of the above

The clinical features of cobalamin deficiency involve the blood, the gastrointestinal tract, and the nervous system.

416 Hematologic manifestations of cobalamin deficiency are due to ?

Harrison's 16th Ed. 603

- A. Anemia
- B. Leucopenia
- C. Thrombocytopenia
- D. All of the above

The hematologic manifestations are almost entirely the result of anemia, although very rarely purpura may appear, due to thrombocytopenia.

417 Which of the following pathological situations can be seen in cobalamin deficiency ?

Harrison's 16th Ed. 603

- A. Demyelination
- B. Axonal degeneration
- C. Neuronal death
- D. All of the above

Initial pathology is demyelination, followed by axonal degeneration & eventual neuronal death.

418 Involvement of which of the following structures is uncommon in cobalamin deficiency ?

Harrison's 16th Ed. 603

- A. Peripheral nerves
- B. Spinal cord
- C. Cerebellum
- D. Cerebrum

Sites of involvement include peripheral nerves; the spinal cord, where the posterior and lateral columns undergo demyelination; and the cerebrum itself.

419 Earliest neurologic manifestation of cobalamin deficiency is ?

Harrison's 16th Ed. 603

- A. Numbness and paresthesia in extremities
- B. Motor weakness
- C. Ataxia
- D. Sphincter disturbances

Signs and symptoms of cobalamin deficiency include numbness and paresthesia in the extremities (the earliest neurologic manifestations), weakness, and ataxia. There may be sphincter disturbances.

420 Neutrophils nucleus of ≥ 6 lobes is suggestive of ?

Harrison's 16th Ed. 605

- A. Megaloblastic anemia
- B. CML
- C. AML
- D. Multiple myeloma

Hypersegmented nuclei of neutrophils is a characteristic finding of megaloblastic anemia. A single cell with a nucleus of six lobes or more raises suspicion of a megaloblastic anemia.

421 Which of the following provides evidence of ineffective erythropoiesis ?

Harrison's 18th Ed. 866

- A. Reduced haptoglobins
- B. Positive urine hemosiderin
- C. Raised serum lactate dehydrogenase
- D. All of the above

Raised urine urobilinogen, reduced haptoglobins and positive urine hemosiderin, and a raised serum lactate dehydrogenase provides evidence of ineffective erythropoiesis.

422 What value of MCV is diagnostic of megaloblastic anemia ?

Harrison's 16th Ed. 605

- A. > 80 fL
- B. > 90 fL
- C. > 100 fL
- D. > 110 fL

Significant and marked macrocytosis (MCV > 100 fL) suggests presence of a megaloblastic anemia. Macrocytosis is less marked with concurrent iron deficiency or thalassemia. Reticulocyte index is low, & leukocyte and platelet count may also be decreased, particularly in severely anemic patients. PBF shows marked anisocytosis & poikilocytosis, with macroovalocytes, which are large, oval, fully hemoglobinized erythrocytes typical of megaloblastic anemias.

423 Causes of macrocytosis include all except ?

Harrison's 16th Ed. 605

- A. Hemolysis
- B. Aplastic anemia
- C. Liver disease
- D. Hyperthyroidism

Macrocytosis occurs in hemolysis, liver disease, alcoholism, hypothyroidism & aplastic anemia.

424 Megaloblastoid morphologic picture of RBC series is seen in ?

Harrison's 16th Ed. 605

- A. Hemolysis
- B. Pernicious anemia
- C. Myelodysplasia
- D. All of the above

Myelodysplasia produces a distinct morphologic picture most apparent in orthochromatic normoblasts in which a megaloblastic nucleus is associated with severely hypochromic cytoplasm. This variant is called "megaloblastoid" meaning presence of both nuclear & cytoplasmic maturation defects. "Megaloblastoid" does not mean "mildly megaloblastic."

425 Megaloblastic anemia is seen in all except ?

Harrison's 16th Ed. 605

- A. Hereditary TC I deficiency
- B. TC II deficiency
- C. Orotic aciduria
- D. Imlerslund-Grasbeck disease

426 Which of the following is not a finding in bone marrow examination in folate or B_{12} deficiency megaloblastic anemia ?

Harrison's 16th Ed. 605

- A. Hypercellularity
- B. Increased myeloid / erythroid ratio
- C. Nuclear-cytoplasmic asynchrony in RBC precursors
- D. Fenestrated nuclear chromatin in RBC precursors

In B_{12} deficiency megaloblastic anemia, bone marrow is hypercellular with decreased myeloid / erythroid ratio & abundant stainable iron. RBC precursors are abnormally large & have nuclei that appear much less mature than would be expected from the development of cytoplasm (nuclear-cytoplasmic asynchrony). Nuclear chromatin is more dispersed & it condenses in a peculiar fenestrated pattern that is very characteristic of megaloblastic erythropoiesis. Abnormal mitoses may be seen. Granulocyte precursors are also affected appearing as giant bands and metamyelocytes. Megakaryocytes are decreased & show abnormal morphology.

427 Incidence of pernicious anemia is increased in ?

Harrison's 18th Ed. 867

- A. Graves' disease
- B. Myxedema
- C. Thyroiditis
- D. All of the above

428 Incidence of pernicious anemia is increased in ?

Harrison's 18th Ed. 867

- A. Addison's disease
- B. Vitiligo
- C. Hypoparathyroidism
- D. All of the above

Incidence of pernicious anemia is increased in patients with other diseases of immunologic origin like Graves' disease, myxedema, thyroiditis, Addison's disease, vitiligo & hypoparathyroidism.

429 Which of the following about pernicious anemia is false ?

Harrison's 18th Ed. 867

- A. Gastric atrophy does not affect antrum of stomach
- B. 90% of patients have antiparietal cell antibody
- C. ~80% of patients have anti-IF antibody
- D. None of the above

~90% patients with PA have antiparietal cell antibody directed against H⁺K⁺-ATPase, while IF antibodies are detected in gastric juice in ~80%. In patients with gastric atrophy without pernicious anemia, antiparietal cell antibody is found in 50%, but anti-IF antibody is usually absent. Antiparietal cell antibody is found in 10 - 15% of random patient population.

430 Which of the following about pernicious anemia is false ?

Harrison's 18th Ed. 867

- A. Hypergastrinemia
- B. Pentagastrin-fast achlorhydria
- C. Relatives have increased incidence of disease
- D. It is uncommon in patients with agammaglobulinemia

PA is associated with hypogammaglobulinemia, with premature graying or blue eyes, and in persons of blood group A. Gastric output of hydrochloric acid, pepsin, and IF is severely reduced. Serum gastrin level is raised, and serum pepsinogen I levels are low.

431 Which of the following is false about pernicious anemia ?

Harrison's 18th Ed. 867

- A. Rare under the age of 30 years
- B. Average age of presentation is 60 years
- C. Men more affected than women
- D. Caused by the absence of IF

Pernicious anemia is the most common cause of cobalamin deficiency. It is caused by absence of IF, due to atrophy of gastric mucosa or autoimmune destruction of parietal cells. Ratio of incidence of PA in men and women among whites is 1:1.6. Average age of presentation is 60 (disease of elderly) & is rare < 30 years of age.

432 Which of the following about pernicious anemia is false ?

Harrison's 18th Ed. 867

- A. Unusually common in agammaglobulinemia
- B. Helicobacter pylori infection is infrequent
- C. Gastric atrophy spares the antrum
- D. None of the above

Pernicious anemia is unusually common in patients with agammaglobulinemia. Helicobacter pylori does not cause parietal cell destruction in pernicious anemia. Most characteristic finding in pernicious anemia is gastric atrophy affecting the acid- and pepsin-secreting portion of the stomach while sparing the antrum.

433 Which of the following about pernicious anemia is false ?

Harrison's 18th Ed. 867

- A. Gastric epithelium atypia common
- B. Hypergastrinemia common
- C. Gastric polyps common
- D. None of the above

Abnormalities in gastric epithelium appear as cellular atypia that must be distinguished from cytologic abnormalities of gastric malignancy. Hypergastrinemia & pentagastrin-fast achlorhydria occur secondary to gastric atrophy. Incidence of gastric polyps & stomach cancer is increased.

434 Which of the following about juvenile pernicious anemia is false ?

Harrison's 18th Ed. 867

- A. Gastric atrophy
- B. Achlorhydria
- C. Serum IF antibodies present
- D. Parietal cell antibodies present

In Juvenile PA, gastric atrophy, achlorhydria and serum IF antibodies are present, but parietal cell antibodies are usually absent.

435 Removal of what length of terminal ileum causes malabsorption of cobalamin ?

Harrison's 18th Ed. 868

- A. 0.2 meter
- B. 0.5 meter
- C. 0.8 meter
- D. 1.2 meter

Removal of 1.2 meters of terminal ileum causes malabsorption of cobalamin.

436 Disease due to mutation in cubulin receptor leading to selective defect in cobalamin absorption is ?

Harrison's 18th Ed. 868

- A. Stickler syndrome
- B. Imerslund-Gräsbeck Syndrome
- C. Cogan's syndrome
- D. Menkes' syndrome

Imerslund-Gräsbeck syndrome is a congenital disorder (autosomal recessive) of selective defect in cobalamin absorption accompanied by nonspecific proteinuria but renal functions are normal. Mutation occurs in cubulin receptor that mediates intestinal absorption of cobalamin-IF complex. Patients have normal amounts of IF & gastric acid as are other tests of intestinal absorption.

437 Combined deficiencies of cobalamin and folic acid is seen in which of the following conditions ?

Harrison's 17th Ed. 648

- A. Gastric achlorhydria
- B. Tropical sprue
- C. Regional enteritis
- D. Pregnancy

Combined deficiencies of cobalamin & folic acid is seen in tropical sprue. Gastric achlorhydria produces cobalamin deficiency by malabsorption due to defective release of cobalamin from food. Regional enteritis produces cobalamin deficiency by malabsorption due to terminal ileum malfunctioning. Pregnancy produces folate deficiency due to increased requirements.

438 Fish tapeworm - D. latum causes megaloblastic anemia due to ?

Harrison's 18th Ed. 868

- A. Defective release of cobalamin from food
- B. Inadequate production of intrinsic factor (IF)
- C. Competition for cobalamin
- D. Intestinal stasis

Megaloblastic anemia or cobalamin neuropathy is seen in persons heavily infested by fish tapeworm, Diphylobothrium latum, due to competition by the worm for cobalamin. Individuals acquire the worm by eating raw or partly cooked fish. Destruction of the worm eliminates the problem.

439 Infestations by fish tapeworm "Diphyllobothrium latum" is common in which of the following countries ?

Harrison's 18th Ed. 868

- A. South East Asia
- B. Scandinavia
- C. South Africa
- D. South America

Individuals acquire fish tapeworm, Diphyllobothrium latum by eating raw or partly cooked fish. Infestation is common around the lakes of Scandinavia, Germany, Japan, North America & Russia.

440 Acute megaloblastic anemia can be seen after ?

Harrison's 18th Ed. 869

- A. Nitrous oxide anesthesia
- B. Halothane anesthesia
- C. Chloroform anesthesia
- D. Ether anesthesia

Nitrous oxide irreversibly oxidizes methylcobalamin to an inactive precursor which inactivates methionine synthase.

441 Malabsorption of folate is seen with which of the following drugs ?

Harrison's 18th Ed. 869

- A. Salazopyrine
- B. Cholestyramine
- C. Triamterene
- D. All of the above

Malabsorption of folate occurs in patients receiving salazopyrine, cholestyramine & triamterene. Antifolate drugs include anticonvulsant drugs (phenytoin, primidone, barbiturates), sulphasalazine, Nitrofurantoin, and tetracycline.

442 Neonatal folate level falls rapidly to the lowest values at ?

Harrison's 18th Ed. 869

- A. 6 weeks of age
- B. 12 weeks of age
- C. 24 weeks of age
- D. 32 weeks of age

Neonatal folate level falls rapidly to the lowest values at about 6 weeks of age.

443 Folic acid deficiency is due to ?

Harrison's 18th Ed. 869

- A. Inadequate intake
- B. Increased demand
- C. Malabsorption
- D. All of the above

444 Conditions that increase demand of folic acid are all except ?

Harrison's 18th Ed. 869

- A. Chronic hemolytic anemias
- B. Pregnancy
- C. Hemodialysis
- D. Tropical sprue

The mechanism of folic acid deficiency in tropical sprue is malabsorption. Rest of the above conditions lead to increased folic acid requirements and cause megaloblastic anemia.

445 Folate deficiency frequently occurs in which of the following ?

Harrison's 18th Ed. 869

- A. Sickle cell disease

- B. Autoimmune hemolytic anemia
- C. Congenital spherocytosis
- D. All of the above

Folate deficiency frequently occurs in chronic hemolytic anemia, particularly in sickle cell disease, autoimmune hemolytic anemia, and congenital spherocytosis.

446 Alcohol causes folic acid deficiency by which of the following mechanism ?

Harrison's 18th Ed. 869

- A. Inadequate intake
- B. Increased requirements
- C. Malabsorption
- D. Impaired metabolism

Alcohol interferes with folate metabolism. Distilled spirits are devoid of folic acid, while beer and wine do not contain enough of vitamin for daily requirement.

447 Which of the following drugs is an inhibitor of dihydrofolate reductase ?

Harrison's 18th Ed. 870

- A. Zidovudine
- B. Methotrexate
- C. Azathioprine
- D. All of the above

448 Which of the following drugs is an inhibitor of dihydrofolate reductase ?

Harrison's 18th Ed. 870

- A. Pentamidine
- B. Trimethoprim
- C. Pyrimethamine
- D. All of the above

Drugs that inhibit DHF reductase include methotrexate, pyrimethamine & trimethoprim. Methotrexate has the most powerful action against the human enzyme, whereas trimethoprim is most active against the bacterial enzyme and is only likely to cause megaloblastic anemia when used in conjunction with sulphamethoxazole in patients with preexisting folate or cobalamin deficiency. The activity of pyrimethamine is intermediate.

449 In megaloblastic anemia due to folate antagonists, which of the following is given ?

Harrison's 18th Ed. 870, 871

- A. Folic acid
- B. Folinic acid
- C. Pyridoxine
- D. All of the above

Megaloblastic anemia due to folate antagonists that inhibit dihydrofolate reductase can be counteracted by folic acid [5-formyl tetrahydrofolate (THF)] in a dose of 100 to 200 mg/day, which circumvents the block in folate metabolism by providing a form of folate that can be converted to 5,10-methylene THF. For the megaloblastic forms of sideroblastic anemia, pyridoxine in pharmacologic doses (~300 mg/day) can be tried. Folinic Acid (5-Formyl-THF) is a stable form of fully reduced folate. It is given orally or parenterally to overcome the toxic effects of methotrexate or other DHF reductase inhibitors.

450 The normal range of cobalamin in serum is ?

Harrison's 18th Ed. 870

- A. 5 to 100 ng/L
- B. 100 to 200 ng/L
- C. 160 to 1000 ng/L
- D. 1000 to 2500 ng/L

The normal range of serum cobalamin in serum is 160 - 1000 ng/L. Values between 100 & 200 ng/L are regarded as borderline.

451 Serum homocysteine is raised in all except ?*Harrison's 18th Ed. 870*

- A. Chronic renal disease
- B. Hyperthyroidism
- C. Alcoholism
- D. Pyridoxine deficiency

Serum homocysteine is raised in early cobalamin & folate deficiency, CKD, alcoholism, smoking, pyridoxine deficiency, hypothyroidism, steroid & cyclosporine therapy. Levels are higher in serum than in plasma, in men than in premenopausal women, in women taking HRT or oral contraceptives. Homocysteine levels are not used for diagnosis of cobalamin or folate deficiency.

452 Levels of which of the following is raised in patients with cobalamin deficiency ?*Harrison's 18th Ed. 870*

- A. Calcium
- B. Iron
- C. Serum methylmalonate (MMA)
- D. Glycine

In patients with cobalamin deficiency sufficient to cause anemia or neuropathy, serum methylmalonate (MMA) level is raised.

453 Normal serum folic acid levels are ?*Harrison's 18th Ed. 870*

- A. 6 to 20 ng / mL
- B. 30 to 40 ng / mL
- C. 60 to 80 ng / mL
- D. 80 to 100 ng / mL

454 Normal range of serum folate is ?*Harrison's 18th Ed. 870*

- A. 2 to 15 µg / L
- B. 12 to 25 µg / L
- C. 25 to 45 µg / L
- D. 42 to 75 µg / L

Normal range of serum folate is 2 to 15 µg/L.

455 In folate deficiency due to drugs inhibiting dihydrofolate reductase, tissue folate concentrations are ?*Harrison's 16th Ed. 605*

- A. Normal
- B. Elevated
- C. Reduced
- D. Any of the above

Various drugs can inhibit dihydrofolate reductase thereby producing folate deficiency. However, tissue folate concentrations remain normal.

456 What value of folic acid is diagnostic of folate deficiency ?*Harrison's 16th Ed. 606*

- A. <=1 ng/mL
- B. <=2 ng/mL
- C. <=3 ng/mL
- D. <=4 ng/mL

457 Which is a better index of folate stores ?*Harrison's 18th Ed. 870*

- A. Serum folate level
- B. RBC folate level

- C. WBC folate level
- D. Platelet folate level

Normal serum folic acid ranges from 6 to 20 ng/mL. Values <=4 ng/mL are considered diagnostic of folate deficiency. Measurement of RBC folate level is not subject to short-term fluctuations in folate intake & is better than serum folate as an index of folate stores.

458 For cobalamin maintenance therapy, 1000 µg of hydroxocobalamin IM is given ?*Harrison's 18th Ed. 871*

- A. Once a month
- B. Once every 2 months
- C. Once every 3 months
- D. Once every 6 months

459 For cobalamin maintenance therapy, 1000 µg of cyanocobalamin IM is given ?*Harrison's 18th Ed. 871*

- A. Once a month
- B. Once every 2 months
- C. Once every 3 months
- D. Once every 6 months

Replenishment of body stores of cobalamin is complete with six 1000-µg IM injections of hydroxocobalamin given at 3- to 7-day intervals. For maintenance therapy, 1000 µg hydroxocobalamin IM once every 3 months is satisfactory. Because of the poorer retention, cyanocobalamin is given 1000 µg IM, monthly.

460 Oral dose of folic acid in folate deficiency is ?*Harrison's 18th Ed. 871*

- A. 5 - 15 mg for ~ 1 month
- B. 5 - 15 mg for ~ 4 months
- C. 5 - 15 mg for ~ 8 months
- D. 5 - 15 mg for ~ 12 months

Oral dose of folic acid in folate deficiency is 5-15 mg daily for ~4 months because all folate-deficient RBC's will be eliminated in this time.

461 Long-term folic acid therapy is required in which of the following ?*Harrison's 18th Ed. 871*

- A. Chronic dialysis
- B. Hemolytic anemias
- C. Gluten-induced enteropathy
- D. All of the above

Long-term folic acid therapy is required in chronic dialysis, hemolytic anemias and gluten-induced enteropathy that does not respond to gluten-free diet.

462 Adenosylcobalamin is required for the conversion of ?*Harrison's 16th Ed. 603*

- A. Methylmalonyl CoA to succinyl CoA
- B. Succinyl CoA to Methylmalonyl CoA
- C. Propionyl CoA to Methylmalonyl CoA
- D. Methylmalonyl CoA to Propionyl CoA

Adenosylcobalamin is required for the conversion of methylmalonyl CoA to succinyl CoA. Lack of this cofactor leads to large increases in the tissue levels of methylmalonyl CoA and its precursor, propionyl CoA. As a consequence, nonphysiologic fatty acids containing an odd number of carbon atoms are synthesized and incorporated into neuronal lipids. This biochemical abnormality may also contribute to the neurologic complications of cobalamin deficiency.

463 Pathway deranged in cobalamin deficiency is ?*Harrison's 16th Ed. 602*

- A Methyltetrahydrofolate to tetrahydrofolate
- B. N^5 -methenyltetrahydrofolate to N^5 -methylene tetrahydrofolate
- C. N^5 -methylene tetrahydrofolate to Dihydrofolate
- D. Dihydrofolate to tetrahydrofolate

Due to IF deficiency, cobalamine is deficient thereby impairing conversion of homocysteine to methionine. Cobalamin is essential for the conversion of methyltetrahydrofolate to tetrahydrofolate. Its absence deranges folate metabolism. Defect in DNA synthesis and megaloblastic maturation pattern in patients who are deficient in cobalamin is due to this mechanism (Folate trap hypothesis).

464 Which of the following about cobalamin is false ?

Harrison's 16th Ed. 602

- A Cobalamin is an essential cofactor for methionine synthase & methylmalonyl-CoA synthase
- B. Methylcobalamin and adenosylcobalamin are metabolically active forms
- C. Therapeutically available as cyanocobalamin
- D. Cyanocobalamin is biologically active

465 Cobalamin deficiency without anemia is common in ?

Harrison's 16th Ed. 605

- A Infants
- B. Adolescents
- C. Adults
- D. Elderly

466 Which isoenzyme of plasma lactic acid dehydrogenase is increased in enhanced intramedullary destruction of erythroblasts ?

Harrison's 16th Ed. 606

- A Isoenzyme 1
- B. Isoenzyme 2
- C. Isoenzyme 3
- D. Isoenzyme 4

Enhanced intramedullary destruction of erythroblasts results in an increase in unconjugated bilirubin and lactic acid dehydrogenase (isoenzyme 1) in plasma.

467 Which of the following manifestations occur with cobalamin deficiency but not with folic acid deficiency ?

Harrison's 16th Ed. 605

- A Gastrointestinal
- B. Neurologic
- C. Hematologic
- D. All of the above

Patients with folic acid deficiency are more malnourished than those with cobalamin deficiency. Gastrointestinal, hematologic manifestations are similar. Neurologic abnormalities do not occur with folic acid deficiency.

468 Folic acid supplementation is required in patients on chronic hemodialysis because ?

Harrison's 16th Ed. 605

- A Folate is lost in dialysate
- B. Heparin reduces folate levels in blood
- C. Protamine reduces folate levels in blood
- D. All of the above

Patients on chronic hemodialysis require folate supplementation to replace that lost in dialysate.

469 Normally, what percentage of RBC precursors are destroyed in bone marrow ?

Harrison's 16th Ed. 606

- A 10 - 15 %
- B. 25 - 30 %
- C. 50 - 60 %
- D. 75 - 80 %

Megaloblastic anemias are characterized by ineffective erythropoiesis. In a severely megaloblastic patient, as many as 90% of RBC precursors may be destroyed before they are released into the bloodstream, compared with 10 to 15% in normal individuals.

470 Clinically significant deficiency of cobalamin is present when its levels are ?

Harrison's 16th Ed. 606

- A < 100 pg / mL
- B. < 200 pg / mL
- C. < 300 pg / mL
- D. < 400 pg / mL

Values <200 pg/mL indicate clinically significant cobalamin deficiency.

471 Reticulocytosis after intramuscular cyanocobalamin therapy for megaloblastic anemia due to cobalamin deficiency peaks at about ?

Harrison's 16th Ed. 606

- A Day 3
- B. Day 5
- C. Day 7
- D. Day 10

Reticulocytosis begins 4 to 5 days after intramuscular cyanocobalamin therapy is started & peaks at ~ day 7. If reticulocytosis does not occur, or if it is less brisk than expected from the level of hematocrit, other factors contributing to anemia (infection, coexisting iron and/or folate deficiency, or hypothyroidism) need to be looked.

Chapter 106. Hemolytic Anemias and Anemia Due to Acute Blood Loss

472 The main cytoskeletal protein is ?

Harrison's 17th Ed. 655

- A Band 3
- B. Band 4.1
- C. Glycophorin
- D. Spectrin

RBC cell membrane (7 nm thick) is a lipid bilayer. Most abundant of the membrane proteins are glycophorins & band 3 (anion transporter). Main cytoskeletal protein is spectrin. Membrane is physically linked to cytoskeleton by proteins (ankyrin & band 4.1 / band 4.2). Spectrin, actin with Bands 4.1 & 4.2 together form a fibrillar, weblike network on inner surface of RBC membrane.

473 Which is the largest component of RBC cell membrane ?

- A Protein
- B. Lipid
- C. Carbohydrate
- D. Others

RBC cell membrane contain ~52% protein, 40% lipid & 8% carbohydrate by weight.

474 Enzyme required for the production & utilization of ATP in RBC cell membrane is ?

- A. Aldolase
- B. Glyceraldehyde-3 phosphate dehydrogenase (G-3PD)
- C. Phosphoglycerate kinase
- D. All of the above

A three-enzyme sequence concerned with ATP production is membrane bound - aldolase, glyceraldehyde-3 phosphate dehydrogenase (G-3PD) & phosphoglycerate kinase. Together, they convert fructose diphosphate to 3-phosphoglycerate with production of ATP.

475 Phospholipid of RBC membrane is ?

- A. Phosphatidylcholine (lecithin)
- B. Phosphatidylethanolamine
- C. Sphingomyelin
- D. All of the above

Most of phospholipid of RBC membrane is phosphatidylcholine (lecithin), phosphatidylethanolamine, sphingomyelin & phosphatidylserine. Lecithin & sphingomyelin can substitute each other.

476 Which of the following gene mutation accounts for majority of autosomal dominant hereditary spherocytosis (HS) ?

Harrison's 17th Ed. 655 Table 101-3

- A. ANK1
- B. SPTA1
- C. SLC4A1
- D. EPB41

Mutations in ANK1 gene on chromosome 8p11.2 producing ankyrin protein accounts for majority of autosomal dominant hereditary spherocytosis (HS).

477 Mutation in which of the following gene is not a cause of hereditary spherocytosis ?

Harrison's 17th Ed. 655 Table 101-3

- A. ANK1
- B. SPTA1
- C. SLC4A1
- D. EPB42

Mutations of SPTA1 gene account for ~65% of Hereditary elliptocytosis (HE).

478 Which of the following is false about hereditary spherocytosis ?

Harrison's 16th Ed. 608

- A. Increased ratio of RBC surface area to volume
- B. Splenomegaly is very common
- C. Mean corpuscular volume usually normal
- D. Mean corpuscular hemoglobin concentration increased

Anemia in HS is normocytic. Increase in MCHC is a characteristic feature. HS is the only condition in which high MCHC is seen.

479 Which of the following is false about hereditary spherocytosis ?

Harrison's 17th Ed. 654

- A. Due to defect in ankyrin / protein 3 / spectrin / palladin
- B. Pigmented gallstones are common
- C. RBC survival after splenectomy is normal
- D. None of the above

Main clinical findings of HS are jaundice, an enlarged spleen, and gallstones. Splenectomy is regarded as an obligatory therapeutic measure in HS.

480 Spherocytes are seen in ?

Harrison's 16th Ed. 609

- A. Cirrhosis liver
- B. Clostridial infections
- C. Snake envenomations
- D. All of the above

481 Pink test is a modified version of which of the following ?

Harrison's 17th Ed. 655

- A. RBC absolute values
- B. Red cell survival study
- C. Osmotic fragility test
- D. Schilling test

A modified version of osmotic fragility test is called the "pink test".

482 Which of the following is false about pyruvate kinase deficiency ?

Harrison's 17th Ed. 655

- A. High reticulocytosis
- B. Oxygen delivery to tissues is increased
- C. Oral folic acid should be given constantly
- D. None of the above

Metabolic block at the last step in glycolysis increase bisphosphoglycerate (or DPG), a major effector of hemoglobin-oxygen dissociation curve. Thus, oxygen delivery to tissues is increased.

483 Which of the following protects RBC's against oxidant stress ?

Harrison's 17th Ed. 653 Figure 101-1

- A. Glutathione
- B. Glucose-6-phosphate dehydrogenase (G6PD)
- C. Pyruvate
- D. Erythropoietin (EPO)

G6PD protects RBC's proteins from oxidative damage by generating NADPH, which maintains high levels of reduced glutathione. Glutathione protects RBC's against oxidant stress.

484 Glucose-6-phosphate dehydrogenase (G6PD) is related to which of the following pathways ?

Harrison's 17th Ed. 653

- A. Embden-Meyerhof pathway
- B. Hexose monophosphate shunt
- C. Purine salvage pathway
- D. All of the above

G6PD is a HMP shunt enzyme.

485 Which of the following reactions is related to G6PD ?

Harrison's 17th Ed. 656

- A. ATP to ADP
- B. ADP to ATP
- C. NADP to NADPH
- D. NADPH to NADP

G6PD reduces NADP to NADPH while oxidizing glucose-6-phosphate (G6P) to 6-phosphogluconate (6PG). NADPH then provides the reducing power that converts oxidized glutathione (GSSG) to reduced glutathione (GSH). Reduced glutathione protects against oxidant injury by catalyzing breakdown of oxidant compounds like H_2O_2 .

486 Which of the following protects the patient from malaria ?

Harrison's 16th Ed. 610

- A. G6PD Deficiency

- B. Hemoglobin S
- C. Hereditary ovalocytosis
- D. All of the above

487 The G6PD gene is located on ?

Harrison's 17th Ed. 656

- A. X chromosome
- B. Y chromosome
- C. Autosome
- D. Any of the above

Gene for G6PD is located on X chromosome. Mode of transmission of G6PD deficiency is X-linked recessive. It is the most common enzymatic disorder of RBC's in humans. Defect is expressed in all erythrocytes of the affected male. In heterozygous female, two populations of red cells, some deficient, others normal, are present owing to random inactivation of the X chromosomes. It follows that males are more vulnerable to oxidant injury than females are.

488 The normal G6PD is designated as ?

Harrison's 16th Ed. 610

- A. Type A (+)
- B. Type A (-)
- C. Type B
- D. Any of the above

Most common normal "wild type" G6PD enzyme is designated as G6PD-B. Two variants, designated G6PD A- ((10 - 60% of activity) and G6PD Mediterranean (<10% of normal activity), lead to clinically significant hemolysis. A- type is present in ~10% of American blacks, G6PD Mediterranean is found in Middle East, G6PD Vianchan & G6PD Mahidol in Southeast Asia, G6PD Canton in China, and G6PD Union worldwide.

489 Which of the following 'vitamins' can cause hemolysis in G6PD deficient subjects ?

Harrison's 16th Ed. 611

- A. Vitamin A
- B. Vitamin D
- C. Vitamin E
- D. Vitamin K

Vitamins that G6PD deficient persons should avoid include vitamin C & K. Vitamin E is protective.

490 Which of the following 'antimalarials' can cause hemolysis in G6PD deficient subjects ?

Harrison's 16th Ed. 611

- A. Chloroquine
- B. Quinine
- C. Primaquine
- D. Mefloquine

Deficiency of G6PD protects against malaria due to *Plasmodium falciparum*.

491 Which of the following can precipitate an episode of hemolysis in G6PD deficient subjects ?

Harrison's 16th Ed. 611

- A. Viral & bacterial infections
- B. Naphthalene
- C. Metabolic acidosis
- D. All of the above

492 Which population of RBC is rapidly destroyed during hemolysis in G6PD deficient subjects ?

Harrison's 17th Ed. 656

- A. Immature

- B. Mature
- C. Older
- D. All of the above

G6PD enzyme activity is normal in reticulocytes, but older RBC's are markedly deficient. Exposure to oxidants induces hemolysis of older red cells but not of younger ones.

493 Which of the following is a peripheral blood finding of hemolysis in G6PD deficiency ?

- A. Heinz bodies
- B. Bite cells or blister cells
- C. Spherocytes
- D. All of the above

Hemolysis in G6PD deficiency is both intravascular & extravascular. Exposure to oxidants causes oxidation of sulfhydryl groups of globin chains leading to denaturation of hemoglobin & formation of precipitates (Heinz bodies) which damage RBC membrane to cause intravascular hemolysis. Heinz bodies decrease RBC deformability, macrophages pluck out or bite Heinz bodies, giving rise to "bite cells". Membrane damage induces formation of spherocytes. Bizarre poikilocytes with RBC's having unevenly distributed hemoglobin are called hemighosts.

494 The enzymatically active form of G6PD is a ?

Harrison's 17th Ed. 656

- A. Monomer
- B. Dimer
- C. Trimer
- D. All of the above

Enzymatically active form of G6PD is either a dimer or a tetramer of a single protein subunit of 514 amino acids.

495 Which of the following is false about acute hemolytic anemia due to G6PD deficiency ?

Harrison's 17th Ed. 657

- A. Hemoglobinemia
- B. Hemoglobinuria
- C. Raised plasma haptoglobin
- D. Raised LDH

Acute hemolytic anemia due to G6PD deficiency leads to anisocytosis, poikilocytosis, polychromasia, spherocytes, reticulocytosis, unconjugated hyperbilirubinemia, hemoglobinemia, hemoglobinuria, low or absent plasma haptoglobin, raised LDH, gallstones, splenomegaly.

496 Which of the following is false about CNSHA ?

Harrison's 17th Ed. 657

- A. Patient is always a male
- B. History of neonatal jaundice (NNJ)
- C. Chronic hemolysis
- D. None of the above

Chronic nonspherocytic hemolytic anemia (CNSHA) is a severe clinical phenotype of G6PD deficiency, always in a male, with history of NNJ.

497 Which of the following element is essential for the activity of glutathione peroxidase (GSHPx) ?

Harrison's 17th Ed. 658

- A. Cobalt
- B. Zinc
- C. Mercury
- D. Selenium

Infantile poikilocytosis is due to deficiency of glutathione peroxidase (GSHPx) due to nutritional deficiency of selenium which is an essential element for the activity of GSHPx.

498 Basophilic stippling is a highly distinctive feature of ?*Harrison's 17th Ed. 658*

- A. Autoimmune Hemolytic Anemia (AIHA)
- B. Familial Hemolytic Uremic Syndrome (HUS)
- C. Pyrimidine 5'-Nucleotidase (P5N) Deficiency
- D. All of the above

P5N is a key enzyme in catabolism of nucleotides arising from degradation of nucleic acids that takes place in final stages of RBC maturation. Basophilic stippling is highly distinctive feature of P5N deficiency. HA caused by lead poisoning is also characterized by basophilic stippling.

499 Drug that can cause hemolysis by depletion of ATP is ?*Harrison's 17th Ed. 659*

- A. Dapsone
- B. Ribavirin
- C. Cisplatin
- D. Methyldopa

Ribavirin causes hemolysis by depletion of ATP. Hyperbaric oxygen, nitrates, chlorates, methylene blue, dapsone, cisplatin cause hemolysis by their oxidative potential. Penicillin acts as a haptens & induces antibody production leading to hemolysis. Methyldopa, through mimicry, produces of an antibody (Rhesus antibody anti-e) against RBC antigen causing hemolysis.

500 Which of the following about HUS due to Shiga toxin producing Escherichia coli O157:H7 is false ?*Harrison's 17th Ed. 659*

- A. Nonimmune [Coombs test (–)] hemolytic anemia
- B. Microangiopathic hemolytic anemia
- C. Thrombocytopenia
- D. Leucopenia

Shiga toxin producing Escherichia coli O157:H7 is an etiologic agent of HUS, more common in children, developing several days after diarrhea. HUS is a nonimmune [Coombs test (–)] hemolytic anemia with classical triad - microangiopathic hemolytic anemia, thrombocytopenia & acute renal failure due to thrombosis of glomerular capillaries. Leucocytosis can cause in HUS.

501 Direct Coombs test is also called ?*Harrison's 17th Ed. 659*

- A. Direct antiglobulin test
- B. Direct agglutination test
- C. Direct antigen test
- D. Direct antibody test

Direct Coombs test is also called Direct antiglobulin test (DAT).

502 Which of the following is false about direct antiglobulin test (DAT) ?*Harrison's 17th Ed. 659*

- A. Reflects in-vivo antibody sensitization of RBC's
- B. Reflects in-vitro antibody sensitization of RBC's
- C. Erythrocytes are washed before the test
- D. Anti-IgG antihuman globulin (AHG) reagent is used

DAT reflects in-vivo antibody sensitization of RBC's. RBC's are washed to remove unbound Ab's & anti-IgG AHG reagent is then added. IgG antibodies cannot cause direct RBC agglutination, but if RBC's are coated with IgG antibodies, AHG reagent will cause them to agglutinate.

503 Which of the following is false about indirect antiglobulin test (IAT) ?*Harrison's 17th Ed. 659*

- A. Used to detect IgG antibodies in serum
- B. Reflects in-vitro antibody sensitization of RBC's
- C. Reagent RBC's are incubated in with serum

- D. Anti-IgG antihuman globulin reagent is not used

Indirect antiglobulin test (IAT) is used to detect the presence of IgG antibodies in serum (in-vitro sensitization). Reagent RBC's are incubated with serum that potentially contains antibodies. If Ab's are present, they bind to their target antigens on reagent RBC's. After an incubation period, RBC's are washed to remove unbound antibodies. Anti-IgG AHG reagent is then added and will cause IgG-coated RBC's to agglutinate.

504 Cold Autoimmune Hemolytic Anemia (AIHA) is caused by ?

- A. IgA antibody
- B. IgG antibody
- C. IgM antibody
- D. ANY of the above

AIHA is usually classified on the basis of thermal amplitude of the autoantibody. Warm AIHA is caused by IgG antibody, whereas cold AIHA is caused by an IgM antibody that fixes complement to the surface of the RBC.

505 Conditions associated with hemolysis and a negative DAT result include all except ?*Harrison's 17th Ed. Chapter 313 Table 313-1*

- A. Hemoglobinopathies
- B. Systemic lupus erythematosus (SLE)
- C. Thrombotic thrombocytopenic purpura (TTP)
- D. Disseminated intravascular coagulation (DIC)

Antierthrocyte membrane autoantibodies in SLE have positive direct Coombs' test (60% prevalence). Some may develop overt hemolysis. Conditions associated with hemolysis and a negative DAT result are Microangiopathic hemolytic anemias (TTP, DIC), Hypersplenism, Liver disease, Hemoglobinopathies (sickle cell disease, thalassemia), Erythrocyte membranopathies (spherocytosis), Erythrocyte enzymopathies (G-6-PD deficiency, pyruvate kinase deficiency), Infectious diseases (Clostridium difficile infection), Erythrocyte trauma (mechanical heart valves).

506 RBC's of which blood group are used in indirect antiglobulin test (IAT) ?

- A. A
- B. B
- C. AB
- D. O

507 Which of the following should be considered in differential diagnosis of chronic Coombs-negative HA ?*Harrison's 17th Ed. 656*

- A. Drug-induced hemolytic anemias
- B. Enzymopathies
- C. Paroxysmal Cold Hemoglobinuria (PCH)
- D. Acute hemolytic transfusion reaction

Enzymopathies (G-6-PD deficiency, pyruvate kinase deficiency) should be considered in the differential diagnosis of any chronic Coombs-negative HA.

508 Most common form of acquired hemolytic anemia in areas where malaria is not endemic is ?*Harrison's 17th Ed. 659*

- A. Paroxysmal Nocturnal Hemoglobinuria (PNH)
- B. Paroxysmal Cold Hemoglobinuria (PCH)
- C. Autoimmune Hemolytic Anemia (AIHA)
- D. Hemolytic Uremic Syndrome (HUS)

Autoimmune Hemolytic Anemia (AIHA) is the most common form of acquired hemolytic anemia in areas where malaria is not endemic.

509 Paroxysmal cold hemoglobinuria (PCH) was more frequent when which of the following disease was prevalent ?*Harrison's 16th Ed. 614*

- A. Tuberculosis
- B. Tertiary syphilis
- C. Gonorrhoea
- D. Protein calorie malnutrition

510 Antibody in Paroxysmal cold hemoglobinuria (PCH) is ?

Harrison's 17th Ed. 660

- A. Anti-Jo-1 antibody
- B. Anti-Smith antibody
- C. Ki-67 monoclonal antibody
- D. Donath-Landsteiner antibody

Antibody in PCH is Donath-Landsteiner antibody which has anti-P specificity and binds to RBC's only at a low temperature (~4°C), and in the presence of complement when temperature becomes 37°C, lysis of RBC's, intravascular hemolysis & hemoglobinuria occurs.

511 Cold Agglutinin Disease (CAD) is related to which of the following ?

Harrison's 17th Ed. 660

- A. Familial cold autoinflammatory syndrome (FCAS)
- B. Cold urticaria
- C. Waldenström macroglobulinemia (WM)
- D. Systemic Mastocytosis

CAD is a form of chronic AIHA & affects elderly. Autoantibody (IgM with anti-I specificity) reacts with RBC's strongly at lower temperatures (cold exposure), not at all at 37°C. Antibody is produced by expanded clone of B lymphocytes and may show as a spike in plasma protein electrophoresis resembling monoclonal gammopathy and may be related to Waldenström macroglobulinemia (WM).

512 Which of the following is the most important protective RBC membrane protein ?

Harrison's 17th Ed. 660

- A. CD29
- B. CD39
- C. CD49
- D. CD59

CD59 (membrane inhibitor of reactive lysis) is a protective RBC membrane protein.

513 Which of the following is diagnostic of PNH ?

Harrison's 17th Ed. 661

- A. CD59–, CD55–
- B. CD59+, CD55–
- C. CD59–, CD55+
- D. CD59+, CD55+

Discrete population of cells that is CD59–, CD55– is diagnostic of PNH.

514 Which of the following is the action of CD59 ?

Harrison's 17th Ed. 661

- A. Inhibits insertion of C9 into cell membrane
- B. Binds C3b
- C. Inhibiting C3 convertases
- D. All of the above

Erythrocytes defend themselves from membrane attack complexes with two membrane-bound proteins, CD55 (decay-accelerating factor), which binds C3b, and CD59, which inhibits the insertion of C9 into the membrane.

515 Which of the following is false about Paroxysmal Nocturnal Hemoglobinuria (PNH) ?

Harrison's 17th Ed. 660

- A. Intracorporeal defect acquired at stem cell level
- B. Hemolytic anemia
- C. Arterial thrombosis
- D. Bone marrow failure

PNH has three attributes - complement-dependent acquired chronic intravascular hemolytic anemia, venous thrombosis & bone marrow failure. Hemolysis often occurs during sleep, when decline in blood pH triggers activation of complement components. Urine is black when patient awakens. Hemoglobin-drenched renal tubules lock iron of Hb into hemosiderin and continuous sloughing of these cells into urine culminates in iron deficiency.

516 Which of the following is false about Paroxysmal Nocturnal Hemoglobinuria (PNH) ?

Harrison's 17th Ed. 660

- A. Hemolysis due to activation of complement
- B. Hemosiderinuria is usually absent
- C. Granulocytopenia & thrombocytopenia
- D. May present as Budd-Chiari syndrome

In PNH, RBC's have an increased susceptibility to complement (C) due to the deficiency on their surface of CD59 & CD55 proteins that normally protect RBC's from activated C. When thrombosis affects hepatic veins, Budd-Chiari syndrome occurs. The hemoglobin-drenched renal tubules lock iron of hemoglobin into hemosiderin, and the continuous sloughing of these cells into the urine culminates in iron deficiency.

517 In Paroxysmal Nocturnal Hemoglobinuria, name of the defective gene is ?

Harrison's 17th Ed. 661

- A. HNF4α
- B. PIG-A
- C. BRCA1
- D. CFTR

PNH results from clonal expansion of hematopoietic stem cells that have somatic mutations in the X-linked gene called PIG-A (phosphatidylinositol glycan class A). PIG-A mutations cause an early block in the synthesis of glycosylphosphatidylinositol (GPI) anchors, which tether many proteins to the cell surface. Consequently, the blood cells in PNH have a partial deficiency (type II) or a complete deficiency (type III) of GPI-linked proteins. Intravascular hemolysis is the consequence of absence of GPI-linked complement regulatory protein CD59. CD59 blocks the formation of terminal complement complex (membrane-attack complex) on the cell surface, thereby preventing erythrocyte lysis and in vitro platelet activation.

518 Which of the following tests is useful in diagnosing Paroxysmal Nocturnal Hemoglobinuria ?

Harrison's 16th Ed. 616, 619

- A. Acidified serum lysis test (Ham's test)
- B. Sucrose lysis test
- C. Analysis of GPI-linked proteins (CD59, DAF)
- D. All of the above

Thomas Hale Ham (1938) developed Ham's test at Thorndike Laboratory of Boston City Hospital and reported that RBC's in PNH are highly susceptible to lysis in an acidic environment. CD55 is called decay-accelerating factor (DAF).

519 Pathway of activation of the complement system is called ?

N Engl J Med 2001;344:1058

- A. Classical pathway
- B. Mannose-binding lectin pathway
- C. Alternative pathway
- D. All of the above

There are three pathways of activation of the complement system - the classical, mannose-binding lectin and alternative pathways. Terminal pathway is common to these three pathways leads to membrane attack complex that lyses cells.

520 Pathways of activation of the complement system converge at the point of cleavage of ?

N Engl J Med 2001;344:1058

- A. C3
- B. C4
- C. C5
- D. C6

3 activation pathways of complement converge to generate C3 convertase that cleaves C3.

521 Eculizumab binds specifically to ?

Harrison's 17th Ed. 661, N Engl J Med 2004;350:553

- A. C1
- B. C3
- C. C4
- D. C5

Eculizumab is a recombinant humanized monoclonal antibody that binds specifically to terminal complement protein C5, inhibiting its cleavage into C5a and C5b, thereby preventing release of inflammatory mediator C5a & formation of the cytolytic pore C5b-C9. Blockade of complement cascade at C5 preserves early components of complement that are essential for opsonization of microorganisms & clearance of immune complexes.

522 RBC membrane is unstable at temperatures above ?

Harrison's 16th Ed. 615

- A. 38 °C
- B. 42 °C
- C. 46 °C
- D. 49 °C

RBC membrane is unstable at temperatures > 49°C due to denaturation of cytoskeletal protein spectrin.

523 In hemolysis, level of unconjugated bilirubin never exceeds ?

Harrison's 16th Ed. 608

- A. 1 to 2 mg / dL
- B. 2 to 3 mg / dL
- C. 3 to 4 mg / dL
- D. 4 to 5 mg / dL

In patients with hemolysis, the level of unconjugated bilirubin never exceeds 4 to 5 mg/dL unless liver function is impaired.

524 Which fraction of lactate dehydrogenase (LDH) is elevated by accelerated RBC destruction ?

Harrison's 16th Ed. 608

- A. 1
- B. 2
- C. 3
- D. 4

LDH, particularly LDH-2, is elevated by accelerated RBC destruction. Serum AST (SGOT) may be elevated but ALT (SGPT) is not.

525 Which of the following is false about 'Haptoglobin' ?

Harrison's 16th Ed. 608

- A. α globulin
- B. Binds to heme in hemoglobin
- C. Decreased in hepatocellular disease
- D. Increased in inflammatory states

Haptoglobin binds specifically to the globin in hemoglobin.

526 Which of the following is false about 'Haptoglobin' ?

Harrison's 16th Ed. 608

- A. Serum concentration is ~1.0 g/L
- B. Low or absent is significant hemolysis
- C. Hemoglobin-haptoglobin complex is cleared rapidly by mononuclear phagocyte system
- D. None of the above

527 Urine is positive with benzidine reaction in ?

Harrison's 16th Ed. 608

- A. Hemoglobinuria
- B. Hematuria
- C. Myoglobinuria
- D. All of the above

Urine is positive with benzidine reaction in hemoglobinuria, hematuria and myoglobinuria.

528 Which of the following stains is used to detect hemosiderin in urinary sediment ?

Harrison's 16th Ed. 608

- A. Prussian blue
- B. Giemsa's stain
- C. Methylene blue
- D. Crystal violet

Prussian blue is used to detect presence of hemosiderin in urine. Positive result indicates that a significant amount of circulating free hemoglobin has been filtered by the kidneys.

529 Drug that cause immunohemolytic anemia is ?

Harrison's 16th Ed. 612 Table 93-7

- A. α -methyldopa
- B. Penicillin
- C. Quinidine
- D. All of the above

Drugs causing warm antibody immunohemolytic anemia are α -methyldopa, penicillin & quinidine.

530 Which of the following can directly parasitize RBC's & cause severe hemolysis ?

Harrison's 16th Ed. 615

- A. Bartonellosis
- B. Malaria
- C. Babesiosis
- D. All of the above

Bartonellosis, malaria & babesiosis directly parasitize RBC & cause severe hemolysis.

531 Spur cell anemia is due to ?

Harrison's 16th Ed. 615

- A. Clostridium welchii infection
- B. HELLP syndrome
- C. Severe hepatocellular disease
- D. Hemolytic-uremic syndrome

Spur cells are irregularly spiculated acanthocytes. Spur cell anemia is a hemolytic anemia with bizarre-shaped RBC occurring in severe hepatocellular disease (Laennec's cirrhosis).

532 Surface membrane of a spur cell (acanthocytes) contain excess of ?

Harrison's 16th Ed. 615

- A. Phospholipid

- B. Cholesterol
- C. Triglyceride
- D. Glycoprotein

Surface membrane of a spur cell contains 50 to 70% excess cholesterol, but its total phospholipid content is normal. This decreases membrane fluidity & cell deformability forbidding their passage through filtering system of spleen.

533 'Burr cells' are found in ?

Harrison's 16th Ed. 615 Figure 93-8

- A. Severe hepatocellular disease
- B. Uremia
- C. DIC
- D. HELLP syndrome

Burr cells or echinocytes are seen in uremia. In such RBC's numerous, regularly spaced, small spiny projections are seen. Echinocytes are a frequent artifact in PBF.

Chapter 107. Aplastic Anemia, Myelodysplasia, and Related Bone Marrow Failure Syndromes

534 Which of the following is not a hypoproliferative anemia ?

Harrison's 18th Ed. 887

- A. Aplastic anemia
- B. Myelodysplasia (MDS)
- C. Pure red cell aplasia (PRCA)
- D. Congenital dyserythropoietic anemia

Hypoproliferative anemia is a prominent feature of bone marrow failure states like aplastic anemia, myelodysplasia (MDS), pure red cell aplasia (PRCA) and myelophthisis.

535 Most cases of aplastic anemia are ?

Harrison's 18th Ed. 887

- A. Idiopathic
- B. Due to drug exposure
- C. Due to immune diseases
- D. Due to inherited disorders

Most cases of aplastic anemia are idiopathic.

536 In aplastic anemia, age affected is ?

Harrison's 18th Ed. 887

- A. Children
- B. Teens
- C. Young adults
- D. Teens & twenties and older adults

In aplastic anemia, men & women are affected equally. The age distribution is biphasic, with the major peak in the teens and twenties and a second rise in older adults.

537 Which of the following is not a late effect of irradiation ?

Harrison's 18th Ed. 888

- A. Aplastic anemia
- B. MDS
- C. Leukemia
- D. All of the above

MDS & leukemia, but probably not aplastic anemia, are late effects of radiation.

538 Which of the following has consistent association with aplastic anemia ?

Harrison's 17th Ed. 663 Table 102-3

- A. Benzene
- B. Chloramphenicol
- C. Carbamazepine
- D. All of the above

539 Which of the following has consistent association with aplastic anemia ?

Harrison's 17th Ed. 663 Table 102-3

- A. Gold
- B. Phenylbutazone
- C. Cimetidine
- D. All of the above

Benzene, hydantoins, carbamazepine, quinacrine, gold, cimetidine, chloramphenicol, phenylbutazone show most consistent association with AA.

540 Which of the following hepatitis virus infections most often precede posthepatitis marrow failure ?

Harrison's 18th Ed. 889

- A. A
- B. B
- C. C
- D. None of the above

Posthepatitis aplastic anemia is typically seronegative (non-A, non-B, non-C, non-G) & probably due to as yet undiscovered infectious agent.

541 Cause of transient aplastic crisis in hemolytic anemias is ?

Harrison's 18th Ed. 889

- A. Hepatitis
- B. Infectious mononucleosis
- C. Parvovirus B19
- D. All of the above

Parvovirus B19 is the cause of transient aplastic crisis in hemolytic anemias.

542 Aplastic anemia is strongly associated with which of the following collagen vascular syndrome ?

Harrison's 18th Ed. 889

- A. Polyarteritis nodosa
- B. Schnitzler's syndrome
- C. Wegener's granulomatosis
- D. Eosinophilic fasciitis

Aplastic anemia is strongly associated with eosinophilic fasciitis which is characterized by painful induration of subcutaneous tissues.

543 Aplastic anemia is strongly associated with which of the following ?

Harrison's 18th Ed. 889

- A. Transfusion-associated graft-versus-host disease (GVHD)
- B. Eosinophilic fasciitis
- C. Systemic lupus erythematosus (SLE)
- D. All of the above

544 Aplastic anemia is related to ?

Harrison's 18th Ed. 889

- A. Fanconi's anemia

- B. Paroxysmal nocturnal hemoglobinuria
- C. Dyskeratosis congenita
- D. All of the above

Fanconi's anemia presents as progressive pancytopenia. Bone marrow from PNH patients show evidence of defective hematopoiesis and may later develop frank marrow aplasia & pancytopenia. In Dyskeratosis congenita, aplastic anemia develops during childhood.

545 Which of the following about Fanconi's anemia is false ?

Harrison's 18th Ed. 889

- A. Autosomal dominant disorder
- B. Short stature, café au lait spots
- C. Type A is due to mutation in FANCA
- D. Increased risk of malignancy

Fanconi's anemia is an autosomal recessive disorder.

546 Dyskeratosis congenita is characterized by all except ?

Harrison's 18th Ed. 889

- A. Abnormal skin pigmentation
- B. Pancreatic insufficiency
- C. Nail dystrophy
- D. Mucosal leucoplakia

Dyskeratosis congenita is an inherited bone-marrow-failure syndrome in childhood & presents with the triad of reticular hyperpigmentation, nail dystrophy and mucous membrane leukoplakia.

547 Dyskeratosis is due to mutations in which of the following genes ?

Harrison's 18th Ed. 889

- A. DKC1
- B. TERC
- C. TERT
- D. Any of the above

Dyskeratosis congenita is due to mutations in genes of the telomere repair complex that maintain telomere length in replicating cells: The X-linked variety is due to mutations in DKC1 (dyskerin) gene, the autosomal dominant type is due to mutation in TERC, which encodes an RNA template, and TERT, which encodes the catalytic reverse transcriptase, telomerase. Mutations in TNF2, a component of the shelterin, proteins that bind the telomere DNA, also occur in dyskeratosis.

548 Shwachman-Diamond syndrome features include all except ?

Harrison's 18th Ed. 889

- A. Pancreatic insufficiency
- B. Malabsorption
- C. Eosinophilia
- D. Risk of aplastic anemia

Schwachman-Diamond syndrome is an autosomal recessive disorder characterised by pancreatic exocrine dysfunction, malabsorption, metaphyseal dysostosis, and bone marrow failure due to compound heterozygous mutations in SBDS.

549 Which cell in the bone marrow is helpful in differentiating aplastic anaemia from hypoplastic myelodysplastic syndromes ?

Harrison's 18th Ed. 889, Lancet 2005;365:1647-56

- A. CD34 positive stem cells
- B. CD38 positive stem cells
- C. CD42 positive stem cells
- D. CD46 positive stem cells

Bone marrow failure results from severe damage to hematopoietic cell compartment. In AA, cells bearing CD34 antigen, a marker of early hematopoietic cells, are greatly diminished, committed & primitive progenitor cells are virtually absent.

550 Which of the following is the most common early symptom in aplastic anemia ?

Harrison's 18th Ed. 890

- A. Bleeding
- B. Infection
- C. Weight loss
- D. Jaundice

Aplastic anemia can have abrupt or insidious onset. Most common early symptom is bleeding. Systemic complaints and weight loss should point to other etiologies of pancytopenia.

551 Which of the following is unusual in aplastic anemia ?

Harrison's 18th Ed. 891

- A. Infection on presentation
- B. Lymphadenopathy
- C. Splenomegaly
- D. All of the above

Infection on presentation, lymphadenopathy & splenomegaly are atypical of aplastic anemia.

552 Which of the following is not a feature of blood smear in aplastic anemia ?

Harrison's 18th Ed. 891

- A. Decreased mean corpuscular volume (MCV)
- B. Few or absent reticulocytes
- C. Normal lymphocyte number
- D. Reduced platelets and granulocytes

In AA, PBF shows large erythrocytes & reduced platelets & granulocytes. MCV is commonly increased. Reticulocytes are absent or few & lymphocyte numbers may be normal or reduced. No immature myeloid forms and abnormal platelets.

553 Which of the following is not a feature of bone marrow cytology in aplastic anemia ?

Harrison's 18th Ed. 891

- A. Dilute aspirate
- B. Hematopoietic cells occupying < 50 % of marrow
- C. Megakaryocytes greatly reduced / absent
- D. Mild megaloblastic erythropoiesis

In AA, bone marrow is readily aspirated but dilute on smear. BM biopsy shows mainly fat under the microscope, with hematopoietic cells occupying <25% of marrow space.

554 Which of the following is false ?

Harrison's 18th Ed. 891, 893

- A. Aplastic anemia is a disease of the young
- B. Agranulocytosis is more frequent in elderly & women
- C. In single lineage failure syndromes, progression to pancytopenia or leukemia is unusual
- D. None of the above

Aplastic anemia is a disease of young. In all the single lineage failure syndromes, progression to pancytopenia or leukemia is unusual.

555 Severe aplastic anemia is defined by ?

Harrison's 18th Ed. 891

- A. Absolute neutrophil count < 500 / μ L
- B. Platelet count < 20,000 / μ L
- C. Absolute reticulocyte count < 60,000 / μ L

D. All of the above

Severe AA is defined by the presence of two of three parameters : absolute neutrophil count <500/ μ L, platelet count <20,000/ μ L & corrected reticulocyte count <1% (or absolute reticulocyte count <60,000/ μ L). Very severe disease is defined as absolute neutrophil count <200/ μ L.

556 Which of the following about aplastic anemia is false ?

Lancet 2005;365:1647-56

- A. CD34+ cells greatly reduced
- B. Immunological deficiencies are common
- C. Normal lymphocyte count
- D. Complete recovery can occur with effective immunosuppressive therapy

557 Which of the following have no value in treating severe acquired aplastic anemia ?

Harrison's 18th Ed. 891

- A. Hematopoietic growth factors (HGFs)
- B. Glucocorticoids
- C. Antithymocyte globulin (ATG)
- D. Bone Marrow Transplantation

Treatment options in severe acquired aplastic anemia are replacement of the absent hematopoietic cells by stem cell transplant, or suppression of immune system. Hematopoietic growth factors (HGFs) are not recommended as initial therapy for severe aplastic anemia, and even their roles as adjuncts to immunosuppression are not clear. Glucocorticoids are of no value.

558 Which of the following is used along with ALG or ATG to increase response rates in aplastic anemia ?

Harrison's 18th Ed. 892

- A. Azithromycin
- B. Zinc
- C. Cyclosporine
- D. Vitamin E

Addition of cyclosporine to ALG (antilymphocyte globulin) or ATG (antithymocyte globulin) increases response rates in AA.

559 With standard regimen of ATG + cyclosporine for AA, improvement in granulocyte number is generally apparent within ?

Harrison's 18th Ed. 892

- A. 1 month of treatment
- B. 2 months of treatment
- C. 3 months of treatment
- D. 4 months of treatment

With standard regimen of ATG + cyclosporine for AA, improvement in granulocyte number is generally apparent within 2 months of treatment.

560 In aplastic anemia treatment responders, MDS develops in what percentage of patients ?

Harrison's 18th Ed. 892

- A. 10 %
- B. 15 %
- C. 20 %
- D. 25 %

In aplastic anemia treatment responders, MDS develops in 15 % of patients.

561 In adults, initial oral dose of cyclosporine in treatment of aplastic anemia is ?

Harrison's 17th Ed. 667

- A. 2 mg/kg per day
- B. 8 mg/kg per day
- C. 12 mg/kg per day
- D. 20 mg/kg per day

Cyclosporine is administered orally at an initial dose of 12 mg/kg per day in adults

562 Trough blood levels of cyclosporine in treatment of aplastic anemia should be between ?

Harrison's 18th Ed. 892

- A. 150 and 200 ng / mL
- B. 250 and 400 ng / mL
- C. 450 and 600 ng / mL
- D. 650 and 800 ng / mL

Trough cyclosporine blood levels in treatment of AA should be between 150 - 200 ng/mL.

563 Most important side effects of chronic cyclosporine treatment include all except ?

Harrison's 18th Ed. 892

- A. Nephrotoxicity
- B. Hepatotoxicity
- C. Hypertension
- D. Seizures

Most important side effects of chronic cyclosporine treatment are nephrotoxicity, hypertension, seizures & opportunistic infections.

564 Dose of Horse ATG in treatment of aplastic anemia is ?

Harrison's 17th Ed. 667

- A. 40 mg/kg per day for 1 day
- B. 40 mg/kg per day for 2 days
- C. 40 mg/kg per day for 3 days
- D. 40 mg/kg per day for 4 days

Horse ATG is given at 40 mg/kg per day for 4 days.

565 The single best method of preventing the spread of infection while treating patients of aplastic anemia is ?

Harrison's 18th Ed. 892

- A. Prompt institution of parenteral, broad-spectrum antibiotics
- B. Hand washing
- C. Nonabsorbed antibiotics for gut decontamination
- D. Total reverse isolation

Hand washing, the single best method of preventing the spread of infection, but remains a neglected practice.

566 In chronic anemia, iron chelators are given after how many blood transfusions ?

Harrison's 18th Ed. 893

- A. 10
- B. 20
- C. 40
- D. 50

In chronic anemia, iron chelators (deferoxamine & deferasirox) are given at around the fiftieth transfusion to avoid secondary hemochromatosis.

567 PRCA is characterized by ?

Harrison's 18th Ed. 893

- A. Anemia
- B. Reticulocytopenia
- C. Absent or rare erythroid precursor cells in bone marrow
- D. All of the above

PRCA is characterized by anemia, reticulocytopenia & absent or rare erythroid precursor cells in bone marrow.

568 Congenital pure red cell aplasia is known as ?

Harrison's 18th Ed. 893

- A. Fanconi's anemia
- B. Shwachman-Diamond syndrome
- C. Kostmann's Syndrome
- D. Diamond-Blackfan anemia

Diamond-Blackfan anemia or congenital PRCA is diagnosed at birth or in early childhood & often responds to glucocorticoid treatment. A minority of patients have etiologic mutations in a ribosomal RNA processing gene called RPS19.

569 Congenital pure red cell aplasia (Diamond-Blackfan syndrome) is which variety of PRCA ?

Harrison's 18th Ed. 893 Table 107-4

- A. Fetal red blood cell aplasia
- B. Hereditary pure red cell aplasia
- C. Acquired pure red cell aplasia
- D. Idiopathic

570 Drug that may cause PRCA is ?

Harrison's 18th Ed. 893 Table 107-4

- A. Phenytoin
- B. Chloramphenicol
- C. Isoniazid
- D. All of the above

Drug that may cause PRCA include phenytoin, azathioprine, chloramphenicol, procainamide, isoniazid and erythropoietin.

571 PRCA may be associated with which of the following ?

Harrison's 18th Ed. 893

- A. Thymoma
- B. Chronic lymphocytic leukemia
- C. Subcutaneous administration of erythropoietin
- D. All of the above

PRCA may be associated with thymoma, large granular lymphocytosis, chronic lymphocytic leukemia, hypogammaglobulinemic and subcutaneous administration of erythropoietin.

572 Pathognomonic cell in bone marrow of PRCA patients with B19 parvovirus infection is ?

Harrison's 18th Ed. 893

- A. Uninuclear megakaryocyte
- B. Giant megakaryoblast
- C. Giant pronormoblast
- D. Ringed sideroblast

Bone marrow in PRCA due to chronic parvovirus infection shows red cell aplasia & giant pronormoblasts, which is the cytopathic sign of B19 parvovirus infection.

573 B19 parvovirus tropism for human erythroid progenitor cells is due to its use of which erythrocyte antigen ?

Harrison's 18th Ed. 893

- A. L

- B. M
- C. P
- D. S

B19 parvo viral tropism for human erythroid progenitor cells is due to its use of erythrocyte P antigen as a cellular receptor for entry.

574 PRCA patients with persistent B19 parvovirus infection respond best to ?

Harrison's 18th Ed. 894

- A. Glucocorticoids
- B. Intravenous immunoglobulin therapy
- C. Cyclosporine
- D. Daclizumab

Almost all patients with PRCA due to persistent B19 parvovirus infection respond to IV Ig therapy (0.4 gram/kg daily for 5 days). Majority of patients with idiopathic PRCA respond favorably to immunosuppression with glucocorticoids, cyclosporine, ATG, azathioprine, cyclophosphamide, and daclizumab (antibody to IL-2 receptor).

575 Which of the following is a feature of myelodysplasias (MDS) ?

Harrison's 18th Ed. 894

- A. Cytopenias
- B. Dysmorphic cellular bone marrow
- C. Ineffective blood cell production
- D. All of the above

Myelodysplasias (MDS) are characterized by cytopenias, dysmorphic cellular bone marrow and by ineffective blood cell production.

576 Which of the following is a myelodysplastic syndrome ?

Harrison's 18th Ed. 894

- A. Refractory anemia (RA)
- B. Refractory anemia with ringed sideroblasts (RARS)
- C. Refractory anemia with excess blasts (RAEB)
- D. All of the above

According to French-American-British Cooperative Group (1983), five entities of MDS are refractory anemia (RA), refractory anemia with ringed sideroblasts (RARS), refractory anemia with excess blasts (RAEB), refractory anemia with excess blasts in transformation (RAEB-t) and chronic myelomonocytic leukemia (CMML). World Health Organization (WHO) classification (2002) classified Myelodysplastic Syndromes/Neoplasms differently.

577 Which of the following is the most frequent classe in WHO estimated proportion of patients with MDS ?

Harrison's 18th Ed. 894 Table 107-5

- A. Refractory anemia (RA)
- B. Refractory anemia with ring sideroblasts (RARS)
- C. Refractory cytopenias with multilineage dysplasia (RCMD)
- D. Refractory anemia with excess blasts, Type 1 (RAEB-1)

578 Which of the following is false about myelodysplastic syndrome ?

Harrison's 18th Ed. 894

- A. Idiopathic MDS is a disease of elderly
- B. Clonal hematopoietic stem cell disorder
- C. Apoptosis of marrow cells increased
- D. None of the above

Idiopathic MDS is a disease of the elderly (mean age at onset - 70 years) and is rare in children. Therapy-related MDS is not age-related. It is a clonal hematopoietic stem cell disorder leading to impaired cell proliferation and differentiation. Apoptosis of marrow cells is increased in MDS.

579 In secondary MDS, latent period is least following which of the following cancer treatments ?

Harrison's 18th Ed. 895

- A. DNA topoisomerase inhibitors
- B. Busulfan
- C. Nitrosourea
- D. Procarbazine

Secondary MDS occurs as a late toxicity of cancer treatment. With busulfan, nitrosourea, or procarbazine, the latent period is 5 - 7 years and with DNA topoisomerase inhibitors it is 2 years.

580 Which of the following skin conditions is related to MDS ?

Harrison's 18th Ed. 896

- A. Gardner syndrome
- B. Sweet's syndrome
- C. Cowden disease
- D. Torre syndrome

Unusual skin lesions, including Sweet's syndrome (febrile neutrophilic dermatosis), occur with MDS, hematologic malignancies, solid tumors, or inflammatory bowel disease.

581 Sideroblasts have granules consisting of ?

Harrison's 17th Ed. 360

- A. Ferritin
- B. Transferrin
- C. Glycogen
- D. All of the above

582 Sideroblasts are ?

Harrison's 17th Ed. 360

- A. Developing erythroblasts
- B. Developing myeloblasts
- C. Defective erythroblasts
- D. Defective myeloblasts

583 Normal percentage of sideroblasts in bone marrow is ?

Harrison's 17th Ed. 360

- A. 5 %
- B. 10 %
- C. 40 %
- D. 75 %

Storage iron is in the form of ferritin or hemosiderin. In bone marrow smears, small ferritin granules are normally seen under oil immersion in 20 - 40% of developing erythroblasts. Such cells are called sideroblasts.

584 In 'ringed sideroblasts', the accumulation of iron is around ?

Harrison's 17th Ed. 361

- A. Cell membrane
- B. Nucleus
- C. Mitochondria
- D. Endoplasmic reticulum

585 Sideroblastic anemia usually points to the diagnosis of ?

Harrison's 17th Ed. 361

- A. Aplastic anemia
- B. Myelodysplasia
- C. Pernicious anemia
- D. All of the above

Acquired defects in heme synthesis is seen in myelodysplasia. Mitochondrial iron loading occurs as iron taken up by mitochondria of developing erythroid cell is not incorporated into heme. Iron-encrusted mitochondria surround the nucleus of erythroid cell, forming a ring. These ringed sideroblasts on marrow iron stain, in sideroblastic anemia almost always reflecting myelodysplasia.

586 Bone marrow in myelodysplasia may show all except ?

Harrison's 18th Ed. 896

- A. Normal or hypercellularity
- B. Ringed sideroblasts
- C. Hypogranulation & hyposegmentation in granulocytic precursors
- D. Decrease in myeloblasts

No single characteristic feature of marrow morphology distinguishes MDS. BM is usually normal or hypercellular with ringed sideroblasts in erythroid lineage, hypogranulation & hyposegmentation in granulocytic precursors, increase in myeloblasts and reduced number of megakaryocytes with disorganized nuclei.

587 In MDS, prognosis strongly correlates with ?

Harrison's 18th Ed. 896

- A. Hypogranulation in granulocytic precursors
- B. Ringed sideroblasts
- C. Proportion of marrow blasts
- D. Circulating myeloblasts

Prognosis strongly correlates with the proportion of marrow blasts. Circulating myeloblasts usually correlate with marrow blast numbers.

588 Which of the following drugs has a role in treatment of MDS ?

Harrison's 18th Ed. 897

- A. Azacytidine
- B. Amifostine
- C. Lenalidomide
- D. All of the above

Only stem cell transplantation offers cure in MDS. Azacitidine (75 mg/m² daily s/c for 7 days), Decitabine (15 mg/m² IV infusion, TDS for three days), Lenalidomide (10 mg orally daily for 3 months), Amifostine (blocks apoptosis), G-CSF + Erythropoietin have a role in MDS. ATG and anti-CD52 monoclonal antibody Campath is effective in younger MDS patients who bear the histocompatibility antigen HLA-DR15.

589 Which of the following is false about myelophthisis ?

Harrison's 18th Ed. 897

- A. Secondary myelofibrosis
- B. Leukoerythroblastic blood smear
- C. Ineffective erythropoiesis
- D. None of the above

Myelophthisis or secondary myelofibrosis is a reactive phenomenon. Fibrosis of BM occurs as a response to invading tumor cells, infections (Mycobacterium, fungi, HIV), sarcoidosis, Gaucher disease, congenital osteopetrosis, radiation therapy or treatment with radiomimetic drugs.

590 Which of the following is false about myelophthisis ?

Harrison's 18th Ed. 897

- A. Myeloid metaplasia
- B. Pancytopenia
- C. Increased circulating hematopoietic progenitor cells
- D. None of the above

Pathophysiology of myelophthisis has three distinct features: proliferation of fibroblasts in marrow space (myelofibrosis), myeloid metaplasia i.e. extension of hematopoiesis into long bones and into extramedullary sites (spleen, liver, and lymph nodes) and ineffective erythropoiesis. Pancytopenia is seen despite very large numbers of circulating hematopoietic progenitor cells.

Chapter 108. Polycythemia Vera and Other Myeloproliferative Diseases

591 Which of the following is a characteristic feature of myeloproliferative disorders (MPDs) ?

N Engl J Med 2006;355:2452-66

- A. Marrow hypercellularity
- B. Thrombosis & hemorrhage
- C. Risk of leukemic transformation in long term
- D. All of the above

Myeloproliferative disorders share many characteristics like marrow hypercellularity, propensity to thrombosis & hemorrhage, and a risk of leukemic transformation in the long term.

592 Which of the following is a Philadelphia (Ph) negative myeloproliferative disorder ?

N Engl J Med 2006;355:2452-66

- A. Polycythemia vera
- B. Essential thrombocythemia
- C. Idiopathic myelofibrosis
- D. All of the above

The three main Ph-negative myeloproliferative disorders are polycythemia vera, essential thrombocythemia and idiopathic myelofibrosis.

593 Which of the following conditions can transform into each other ?

Harrison's 18th Ed. 898

- A. Polycythemia vera (PV)
- B. Primary myelofibrosis (PMF)
- C. Essential thrombocytosis (ET)
- D. All of the above

PV, PMF and ET are capable of transforming into each other. Transformation to acute leukemia is uncommon.

594 Which of the following conditions can transform into each other ?

Harrison's 18th Ed. 898

- A. Chronic myelogenous leukemia (CML)
- B. Chronic neutrophilic leukemia (CNL)
- C. Chronic eosinophilic leukemia (CEL)
- D. None of the above

CML, CNL and CEL cannot transform into each other. But all three have a high rate of transformation into acute leukemia.

595 Which of the following about polycythemia vera is false ?

Harrison's 18th Ed. 898

- A. Clonal disorder
- B. Increased phenotypically normal RBC, WBC & platelets
- C. Absence of recognizable physiologic stimulus
- D. None of the above

596 Which of the following illustrates the mutation in JAK2 in the pathogenesis of PV ?

Harrison's 18th Ed. 898, N Engl J Med 2013;368:161-70

- A. F617V
- B. F716V

- C. V617F
- D. V716F

Mutation in tyrosine kinase JAK2 - replaces valine with phenylalanine (V617F) causes its constitutive activation (erythropoietin-independent) is central in the pathogenesis of PV. Gain-of-function JAK2 mutations underlie polycythemia vera (PV), essential thrombocytosis (ET), and myelofibrosis (MF).

597 Which out of the following do not use the JAK-STAT pathway as their essential mode of signaling ?

N Engl J Med 2013;368:161-70

- A. Erythropoietin
- B. Interleukins 1
- C. Thrombopoietin
- D. Growth hormone

Erythropoietin, thrombopoietin, growth hormone, prolactin, and leptin use JAK-STAT pathway. Tumor necrosis factor, interleukins 1 and 8, transforming growth factor β and macrophage colony-stimulating factor do not use the JAK-STAT pathway as their essential mode of signaling.

598 Which of the following is a member of Janus kinases (JAKs) ?

N Engl J Med 2013;368:161-70

- A. Tyrosine kinase 2 (TYK2)
- B. JAK1
- C. JAK2
- D. All of the above

There are four JAKs: JAK1, JAK2, JAK3, and tyrosine kinase 2 (TYK2). All JAKs selectively associate with cytoplasmic domains of various cytokine receptors. JAK3 & TYK2 are primarily important for immune responses. JAK1 & JAK2 have roles that range from host defense and hematopoiesis to growth and neural development.

599 Which of the following about signal transducer and activator of transcription (STAT) is false ?

N Engl J Med 2013;368:161-70

- A. DNA-binding proteins
- B. Translocate to the nucleus
- C. Regulate gene expression
- D. None of the above

Cytokine (interferon- γ , interferon- α , and interferon- β , erythropoietin, growth hormone, interleukin-2, interleukin-6, interleukin-7) binding activates JAKs, which in turn phosphorylate cytokine receptors. This process allows the selective binding of members of the STAT family: STAT1, STAT2, STAT3, STAT4, STAT5A, STAT5B, and STAT6. These DNA-binding proteins become tyrosine-phosphorylated, which allows them to dimerize, translocate to the nucleus, and regulate gene expression.

600 JAK3 associates with which of the following cytokine receptors ?

N Engl J Med 2013;368:161-70

- A. Interleukin-1R γ chain
- B. Interleukin-2R γ chain
- C. Interleukin-3R γ chain
- D. Interleukin-4R γ chain

Activated JAKs phosphorylate (P) and activate STATs and other pathways. Some JAKs are associated with many different cytokine receptors, but JAK3 associates with only one subunit, the common interleukin-2R γ chain, or γ_c . Loss-of-function mutations of the genes encoding γ_c and JAK3 result in severe combined immunodeficiency (SCID). Mutation of TYK2 also results in immunodeficiency.

601 JAK2 mutations are associated with which of the following ?

N Engl J Med 2013;368:161-70

- A. Polycythemia vera
- B. Essential thrombocythemia
- C. Primary myelofibrosis

- D. All of the above

JAK2 mutations are associated with myeloproliferative neoplasms, clonal cancers arising from hematopoietic progenitor cells, which include polycythemia vera, essential thrombocythemia, and primary myelofibrosis.

602 Loss-of-function mutations of STAT3 result in ?

N Engl J Med 2013;368:161-70

- A. Susceptibility to mycobacteria
- B. Chronic mucocutaneous candidiasis
- C. Hyper-IgE syndrome or Job's syndrome
- D. All of the above

Gain-of-function JAK2 mutations underlie polycythemia vera (PV), essential thrombocythemia (ET), and myelofibrosis (MF). Autosomal dominant loss-of-function mutations of STAT1 result in susceptibility to mycobacteria only. Autosomal recessive mutations of STAT1 cause susceptibility to mycobacteria and viruses. Autosomal dominant gain-of function mutations of STAT1 cause chronic mucocutaneous candidiasis, and aneurysms. Loss-of-function mutations of STAT3 result in the hyper-IgE syndrome. Mutations in STAT3 also cause large granular lymphocytic (LGL) leukemia. Constitutive STAT3 and STAT5 activation is associated with many cancers. Mutations of STAT5B result in a syndrome characterized by dwarfism and autoimmunity.

603 Polymorphisms of STAT3 are associated with which of the following ?

N Engl J Med 2013;368:161-70

- A. Ankylosing spondylitis
- B. Rheumatoid arthritis
- C. Systemic lupus erythematosus
- D. Allergic disease

Polymorphisms of STAT3 are associated with ankylosing spondylitis, polymorphisms of STAT4 are associated with rheumatoid arthritis, systemic lupus erythematosus, and other autoimmune diseases and polymorphisms of STAT6 are associated with allergic disease.

604 Which of the following is a JAK inhibitor ?

N Engl J Med 2013;368:161-70

- A. Ruxolitinib
- B. Baricitinib
- C. Tofacitinib
- D. All of the above

JAK1 Inhibitors include Ruxolitinib, baricitinib, tofacitinib, GLPG0634, ASP015K, AZD1480. JAK2 Inhibitors include Ruxolitinib, baricitinib, tofacitinib, pacritinib, lestaurtinib, AZD1480. JAK3 Inhibitors include Tofacitinib, VX-509, ASP015K.

605 JAK2 gene is located on the ?

Harrison's 18th Ed. 898

- A. Short arm of chromosome 9
- B. Long arm of chromosome 9
- C. Short arm of chromosome 10
- D. Long arm of chromosome 10

JAK2 gene is located on the short arm of chromosome 9. Loss of heterozygosity on chromosome 9p, due to mitotic recombination is the most common cytogenetic abnormality in PV.

606 Which of the following is false about Janus kinase 2 (JAK2) ?

N Engl J Med 2006;355:2452-66

- A. Nuclear tyrosine kinase
- B. Intracellular signaling by receptors for erythropoietin
- C. Intracellular signaling by receptors for GM-CSF
- D. Intracellular signaling by receptors for thrombopoietin

JAK2 is a nonreceptor "cytoplasmic" tyrosine kinase and is critical for instigating intracellular signaling by receptors for erythropoietin, thrombopoietin, interleukin-3, granulocyte colony-stimulating factor (G-CSF) and granulocyte-macrophage colony-stimulating factor (GM-CSF).

607 Which of the following is false in the pathogenesis of PV ?

Harrison's 18th Ed. 898

- A. Erythropoietin-independent erythroid colony formation
- B. Hypersensitivity of PV erythroid progenitor cells to EPO
- C. Resistance of PV erythroid progenitor cells to apoptosis
- D. None of the above

Constitutive activation of JAK2 can explain the erythropoietin-independent erythroid colony formation, and hypersensitivity of PV erythroid progenitor cells to erythropoietin and other hematopoietic growth factors, their resistance to apoptosis in vitro in the absence of erythropoietin, their rapid terminal differentiation, and their increase in Bcl-X_L expression, all of which are characteristic in PV.

608 Which of the following typically distinguishes polycythemia vera from other causes of erythrocytosis ?

Harrison's 18th Ed. 899

- A. Massive splenomegaly
- B. High hemoglobin
- C. High hematocrit
- D. Aquagenic pruritus

Splenomegaly, high Hb, high PCV, hyperviscosity leading to venous or arterial thrombosis, systolic hypertension, erythromelalgia, gout, uric acid stones are features of PV. With the exception of aquagenic pruritus, no symptoms distinguish PV from other causes of erythrocytosis.

609 Spurious erythrocytosis is also termed as ?

Harrison's 18th Ed. 899

- A. Budd-Chiari syndrome
- B. Bartter's syndrome
- C. Gray-platelet syndrome
- D. Geisbock's syndrome

610 Which of the following causes microcytic erythrocytosis ?

Harrison's 18th Ed. 899

- A. β -thalassemia trait
- B. Hypoxic erythrocytosis
- C. Polycythemia vera (PV)
- D. All of the above

Only three situations cause microcytic erythrocytosis: β -thalassemia trait, hypoxic erythrocytosis, and PV.

611 Normal range for plasma erythropoietin is ?

Harrison's 16th Ed. 627

- A. 1 to 11 mU / mL
- B. 4 to 26 mU / mL
- C. 21 to 54 mU / mL
- D. 34 to 90 mU / mL

Normal range for plasma erythropoietin is 4 to 26 mU/mL.

612 Which of the following is false about polycythemia vera ?

Harrison's 18th Ed. 903

- A. Erythroid progenitor cells are resistant to apoptosis
- B. Autonomous clonal form of erythrocytosis
- C. Elevated plasma erythropoietin level excludes polycythemia vera as the cause for erythrocytosis
- D. Abundant bone marrow iron

Absent marrow iron in the presence of marrow hypercellularity is a feature of PV. An elevated erythropoietin level excludes PV as the cause of erythrocytosis.

613 Thrombosis in polycythemia vera is due to ?*Harrison's 18th Ed. 900*

- A. Erythrocytosis
- B. Leucocytosis
- C. Thrombocytosis
- D. All of the above

*Thrombosis due to erythrocytosis is the most significant complication of PV.***614 Intractable generalized pruritus in polycythemia vera responds to ?***Harrison's 18th Ed. 900*

- A. Hydroxyurea
- B. Interferon (IFN)- α
- C. PUVA therapy
- D. All of the above

*In PV, generalized pruritus not responding to antihistamines can be treated with hydroxyurea, interferon- α , & psoralens with ultraviolet light in the A range (PUVA).***615 Drug 'Anagrelide' is a ?***Harrison's 18th Ed. 900*

- A. Phosphodiesterase inhibitor
- B. Salicylate isomer
- C. Anticoagulant
- D. Cytotoxic agent

*Anagrelide, a phosphodiesterase inhibitor, can reduce the platelet count and is preferable to hydroxyurea because it lacks marrow toxicity. Anagrelide is protective against venous thrombosis.***616 Chronic primary myelofibrosis is characterised by all except ?***Harrison's 18th Ed. 900*

- A. Jaundice
- B. Marrow fibrosis
- C. Extramedullary hematopoiesis
- D. Splenomegaly

*Chronic PMF is a clonal disorder of a multipotent hematopoietic progenitor cell of unknown etiology characterized by marrow fibrosis, extramedullary hematopoiesis, and splenomegaly.***617 JAK2 V617F is present in what percentage of PMF patients ?***Harrison's 18th Ed. 901*

- A. 10 %
- B. 25 %
- C. 50 %
- D. 75 %

*JAK2 V617F is present in approximately 50% of PMF patients and mutations in the thrombopoietin receptor Mpl occur in about 5%.***618 Fibrosis and osteosclerosis in PMF is due to ?***Harrison's 18th Ed. 901*

- A. Overproduction of transforming growth factor
- B. Overproduction of tissue inhibitors of metalloproteinases
- C. Overproduction of osteoprotegerin
- D. All of the above

*Fibrosis in PMF is due to overproduction of transforming growth factor and tissue inhibitors of metalloproteinases, while osteosclerosis is due to overproduction of osteoprotegerin, an osteoclast inhibitor. Marrow angiogenesis is due to increased production of vascular endothelial growth factor. Fibroblasts in PMF are polyclonal and not part of the neoplastic clone.***619 Exuberant extramedullary hematopoiesis can cause which of the following ?***Harrison's 18th Ed. 901*

- A. Pulmonary hypertension
- B. Intracranial hypertension
- C. Spinal cord compression
- D. All of the above

*Exuberant extramedullary hematopoiesis can cause ascites, pulmonary hypertension, intestinal or ureteral obstruction, intracranial hypertension, pericardial tamponade, spinal cord compression, skin nodules, rapid splenic enlargement & splenic infarctions, & hyperuricemia & secondary gout.***620 Presence of which of the following establishes the occurrence of extramedullary hematopoiesis ?***Harrison's 18th Ed. 901*

- A. Teardrop-shaped red cells
- B. Nucleated red cells
- C. Myelocytes and promyelocytes
- D. All of the above

*The presence of teardrop-shaped red cells, nucleated red cells, myelocytes, and promyelocytes establishes the presence of extramedullary hematopoiesis.***621 In PMF, which of the following is seen ?***Harrison's 18th Ed. 902*

- A. Antinuclear antibodies
- B. Rheumatoid factor
- C. Positive Coombs' test
- D. All of the above

*An intriguing feature of PMF is the occurrence of autoimmune abnormalities such as immune complexes, antinuclear antibodies, rheumatoid factor, or a positive Coombs' test.***622 Which of the following is false about essential thrombocytosis ?***Harrison's 18th Ed. 902, 903*

- A. Clonal disorder of unknown etiology
- B. Female predominance
- C. Patients have hemorrhagic & thrombotic tendencies
- D. None of the above

*Very high platelet counts are associated primarily with hemorrhage due to acquired von Willebrand disease.***623 Disorders that can masquerade as essential thrombocytosis include ?***Harrison's 18th Ed. 902*

- A. CML
- B. Polycythemia vera
- C. Myelodysplasia
- D. All of the above

*CML, polycythemia vera, or myelodysplasia can masquerade as essential thrombocytosis.***624 'Mpl' is the receptor for ?***Harrison's 18th Ed. 903*

- A. Erythropoietin
- B. Granulocyte-macrophage colony-stimulating factor
- C. Thrombopoietin
- D. All of the above

Megakaryocytopoiesis and platelet production depend upon thrombopoietin and its receptor, Mpl in addition to interleukin 3 (IL-3) and stem cell factor. Their subsequent development is also enhanced by the chemokine stromal cell-derived factor 1 (SDF-1).

625 Megakaryocyte receptor of thrombopoietin (TPO) is ?

Harrison's 18th Ed. 903

- A. a-mpl
- B. b-mpl
- C. c-mpl
- D. d-mpl

Megakaryocyte receptor of TPO is a protooncogene c-mpl. TPO (c-mpl ligand) is secreted continuously at a low level and binds tightly to circulating platelets. A reduction in platelet count increases the level of free TPO & thereby stimulates megakaryocyte & platelet production.

626 Thrombopoietin is produced in ?

Harrison's 18th Ed. 903

- A. Liver
- B. Pancreas
- C. Lungs
- D. Thymus

Like erythropoietin, thrombopoietin is produced in both the liver and the kidneys, and an inverse correlation exists between the platelet count and plasma thrombopoietic activity.

627 Gene for thrombopoietin is located on which chromosome ?

Harrison's 18th Ed. 903

- A. 1
- B. 2
- C. 3
- D. 4

Genes for thrombopoietin and its receptor Mpl are located on chromosomes 3 and 1 respectively.

628 Bleeding associated with thrombocytosis responds to ?

Harrison's 18th Ed. 904

- A. Salicylates
- B. IFN-α
- C. Anagrelide
- D. ε-aminocaproic acid

Bleeding associated with thrombocytosis usually responds to ε-aminocaproic acid.

Chapter 109. Acute and Chronic Myeloid Leukemia

629 In myeloid leukemias, neoplastic cells of hematopoietic system infiltrate which of the following ?

Harrison's 18th Ed. 905

- A. Blood
- B. Bone marrow
- C. Other tissues
- D. All of the above

Myeloid leukemias are characterized by infiltration of the blood, bone marrow, and other tissues by neoplastic cells of the hematopoietic system.

630 Incidence of acute myeloid leukemia (AML) is ?

Harrison's 18th Ed. 905

- A. 1.5 per 100,000 people per year
- B. 2.5 per 100,000 people per year
- C. 3.5 per 100,000 people per year

D. 4.5 per 100,000 people per year

Incidence of acute myeloid leukemia (AML) is 3.5 per 100,000 people per year, higher in men than in women. AML incidence increases with age, and median age at diagnosis is 67 years.

631 Disease associated with an increased incidence of AML is ?

Harrison's 18th Ed. 905

- A. Down syndrome
- B. Fanconi anemia
- C. Ataxia telangiectasia
- D. All of the above

Down syndrome, Fanconi anemia, Bloom syndrome, Ataxia telangiectasia, Kostmann syndrome, myeloproliferative syndromes, germ-line mutations of CCAAT/enhancer-binding protein (CEBPA), runt-related transcription factor 1 (RUNX1), and tumor protein p53 (TP53) are associated with an increased incidence of AML.

632 Increase in the risk of myeloid leukemias peak how many years after radiation exposure ?

Harrison's 18th Ed. 905

- A. 2 - 3 years
- B. 5 - 7 years
- C. 10 - 15 years
- D. 20 - 25 years

High-dose radiation increase the risk of myeloid leukemias that peak 5 - 7 years after exposure. Therapeutic radiation alone adds little risk of AML.

633 Use of which of the following drugs may evolve into AML ?

Harrison's 18th Ed. 905

- A. Chloramphenicol
- B. Phenylbutazone
- C. Chloroquine
- D. All of the above

Anticancer drugs are the leading cause of therapy-associated AML occurring 4-6 years after exposure. Chloramphenicol, phenylbutazone, chloroquine & methoxypsoralen can result in bone marrow failure that may evolve into AML.

634 In WHO classification, the blast cutoff for a diagnosis of AML is ?

Harrison's 18th Ed. 905

- A. 10 %
- B. 15 %
- C. 20 %
- D. 30 %

635 In French-American-British (FAB) classification, the blast cutoff for a diagnosis of AML is ?

Harrison's 18th Ed. 905

- A. 10 %
- B. 15 %
- C. 20 %
- D. 30 %

Difference between WHO and FAB systems for a diagnosis of AML is the blast cutoff. It is 20% in WHO classification and 30% in FAB.

636 Out of the following, which acute myeloid leukemia is most common ?

Harrison's 17th Ed. 678 Table 104-1

- A. M0 - Minimally differentiated leukemia
- B. M1- Myeloblastic leukemia without maturation

- C. M2 - Myeloblastic leukemia with maturation
- D. M3 - Hypergranular promyelocytic leukemia

Minimally differentiated leukemia (M0 - 5%), Myeloblastic leukemia without maturation (M1 - 20%), Myeloblastic leukemia with maturation (M2 - 30%), Hypergranular promyelocytic leukemia (M3 - 10%).

637 Out of the following, which acute myeloid leukemia is most common ?

Harrison's 17th Ed. 678 Table 104-1

- A. M4 - Myelomonocytic leukemia
- B. M5 - Monocytic leukemia
- C. M6 - Erythroleukemia (DiGuglielmo's disease)
- D. M7 - Megakaryoblastic leukemia

Myelomonocytic leukemia (M4 - 20%), Monocytic leukemia (M5 - 10%), Erythroleukemia (DiGuglielmo's disease) (M6 - 4%), Megakaryoblastic leukemia (M7 - 1%).

638 Which of the following is false about AML with t(15;17) cytogenetic rearrangement ?

Harrison's 18th Ed. 905

- A. Juxtaposes PML with RAR α
- B. Encodes a chimeric protein
- C. Associated with disseminated intravascular coagulation
- D. Have a very poor prognosis

AML FAB M3 is called acute promyelocytic leukemia (APL) based on presence of either t(15;17)(q22;q12) cytogenetic rearrangement or PML/RAR α product of translocation. They have a very good prognosis. DIC is associated with t(15;17). Patients with complex karyotype, t(6;9), inv(3) or 7 have a very poor prognosis.

639 Which of the following is false about AML with t(8;21) cytogenetic rearrangement ?

Harrison's 17th Ed. 678

- A. Older age
- B. Associated with myeloid sarcomas
- C. Granulocytic sarcoma or chloroma common
- D. Back pain, lower extremity weakness common

AML associated with younger age are t(8;21) & t(15;17), with older age are del(5q) and del(7q).

640 What proportion of AML patients will have leukocyte count of more than 100,000 per μ L ?

Harrison's 18th Ed. 908

- A. 10 %
- B. 20 %
- C. 30 %
- D. 40 %

Median presenting leukocyte count is about 15,000/ μ L. 25 & 40% of patients have counts <5000/ μ L, & 20% have counts >100,000/ μ L. <5% have no detectable leukemic cells in the blood.

641 What proportion of AML patients will have platelet count of less than 100,000 per μ L ?

Harrison's 18th Ed. 908

- A. 25 %
- B. 50 %
- C. 75 %
- D. 100 %

Platelet counts <100,000/ μ L are found at diagnosis in 75% of patients, and about 25% have counts <25,000/ μ L.

642 Auer rods are seen in ?

- A. Acute myeloid leukemia
- B. Myelodysplastic syndromes
- C. Chronic myelomonocytic leukemia
- D. All of the above

Auer rods are a hallmark of acute myeloid leukemia but occasionally are seen in myelodysplastic syndromes (MDSs) or chronic myelomonocytic leukemia.

643 Rasburicase is used in ?

Harrison's 18th Ed. 909

- A. Contrast nephropathy
- B. Salt-wasting nephropathy
- C. Uric acid nephropathy
- D. Diabetic nephropathy

Rasburicase, a recombinant uric-oxidase enzyme, catalyzes enzymatic oxidation of uric acid into a soluble metabolite, allantoin. Rasburicase is contraindicated in G6PD deficiency. It is used in uric acid nephropathy, & tumor lysis syndrome.

644 In determining complete remission (CR) in AML, which of the following is not included ?

Harrison's 18th Ed. 910

- A. Neutrophil count
- B. Platelet count
- C. Hemoglobin concentration
- D. Circulating blasts

In determining CR, blood neutrophil count must be $\geq 1000/\mu$ L & platelet count $\geq 100,000/\mu$ L & circulating blasts should be absent. Hemoglobin level is not considered in determining CR.

645 In determining complete remission (CR) in AML, which of the following is included ?

Harrison's 18th Ed. 910

- A. Bone marrow cellularity >20% with trilineage maturation
- B. <5% blasts in bone marrow
- C. Absent Auer rods
- D. All of the above

In determining CR, bone marrow cellularity should be >20% with trilineage maturation with <5% blasts, and Auer rods should be absent. Extramedullary leukemia should not be present.

646 In AML, which of the following predict poor outcome with initial therapy ?

Harrison's 18th Ed. 910

- A. Advancing age
- B. Hyperleukocytosis (>100,000/ μ L) at presentation
- C. Secondary AML after cytotoxic agents
- D. All of the above

Advancing age is associated with a poorer prognosis because AML in older patients differs biologically (multidrug resistance 1 (MDR1) efflux pump). Prolonged symptomatic interval with cytopenias (anemia, leukopenia, &/or thrombocytopenia for >3 months) preceding diagnosis of AML is associated with lower CR rate & shorter survival time. Secondary AML due to cytotoxic agents is difficult to treat successfully. Hyperleukocytosis (>100,000/ μ L), early CNS bleeding & pulmonary leukostasis contribute to poor outcome with initial therapy. Patients who achieve CR after one induction cycle have longer CR durations than those requiring multiple cycles.

647 Which of the following chromosome findings in AML have a very good prognosis ?

Harrison's 18th Ed. 910

- A. t(15;17)
- B. t(8;21)

- C. t(6;9)
- D. inv(3)

AML patients with t(15;17) have a very good prognosis (~85% cured), those with t(8;21) and inv(16) a good prognosis (~55% cured), those with no cytogenetic abnormality have a moderately favorable outcome (~40% cured). AML patients with a complex karyotype, t(6;9), inv(3), or -7 have a very poor prognosis.

648 Antimetabolite Cytarabine interferes with which phase of cell cycle ?

Harrison's 18th Ed. 910

- A M-phase
- B S-phase
- C G1-phase
- D G2-phase

Cytarabine is a cell cycle S-phase-specific antimetabolite that becomes phosphorylated intracellularly to an active triphosphate form (1-β-D-arabinofuranylcytosine-triphosphate) that interferes with DNA synthesis.

649 Which of the following drugs are of use in AML ?

Harrison's 18th Ed. 910

- A Idarubicin
- B Cytarabine
- C Daunorubicin
- D All of the above

Most commonly used CR induction regimens in AML (other than acute promyelocytic leukemia - APL) is a combination chemotherapy with cytarabine and Daunorubicin or Idarubicin. Addition of etoposide may improve the CR duration.

650 After how many induction courses, AML patients who fail to attain CR should proceed to allogeneic stem cell transplant ?

Harrison's 18th Ed. 911

- A 1
- B 2
- C 3
- D 4

Patients who fail to attain CR after two induction courses should immediately proceed to an allogeneic hematopoietic stem cell transplant (HSCT) if an appropriate donor exists.

651 Toxicity with high-dose cytarabine includes ?

Harrison's 18th Ed. 911

- A Myelosuppression
- B Pulmonary toxicity
- C Irreversible cerebellar toxicity
- D All of the above

Toxicity with high-dose cytarabine includes myelosuppression, pulmonary toxicity, and significant and occasionally irreversible cerebellar toxicity.

652 Which of the following may protect heart against anthracycline toxicity ?

Harrison's 18th Ed. 839

- A Ascorbic acid
- B Iron
- C Thiamine
- D Dexrazoxane

Dexrazoxane is an antidote to doxorubicin-induced extravasation. It's an intracellular Fe chelator, protects heart against anthracycline toxicity by preventing Fe-dependent free-radical generation.

653 Which of the following drugs is used in the treatment of acute promyelocytic leukemia (APL) ?

Harrison's 18th Ed. 912

- A Gemcitabine
- B Etoposide
- C Asparaginase
- D Tretinoin

Chronic Myeloid Leukemia (CML)

654 Which of the following is false about CML ?

Harrison's 18th Ed. 914

- A Incidence is 1.5 per 100,000 people per year
- B Incidence is higher in men than in women
- C Incidence decreased slightly between 1973 and 1991
- D None of the above

655 Incidence of CML increases slowly with age until mid forties, when it starts to ?

Harrison's 18th Ed. 914

- A Fall rapidly
- B Rise rapidly
- C Remains the same
- D Any of the above

Incidence of CML increases slowly with age until mid forties, then rises rapidly.

656 In CML, there occurs a reciprocal translocation between ?

Harrison's 18th Ed. 914

- A Chromosomes 5 and 18
- B Chromosomes 7 and 20
- C Chromosomes 9 and 22
- D Chromosomes 11 and 22

In CML, clonal expansion of hematopoietic stem cell with reciprocal translocation between chromosomes 9 & 22 occurs.

657 "BCR" stands for ?

Harrison's 18th Ed. 914

- A Bridgepoint cluster region
- B Breakpoint cluster region
- C Bilateral cluster region
- D Big cluster region

BCR stands for breakpoint cluster region.

658 "ABL" is named after ?

Harrison's 18th Ed. 914

- A Abelson murine leukemia virus
- B Anderson murine leukemia virus
- C Atkin murine leukemia virus
- D Ashley murine leukemia virus

ABL is named after abelson murine leukemia virus gene.

659 In CML, nature of fusion of BCR gene ABL gene is ?

Harrison's 18th Ed. 914

- A Head-to-tail

- B. Tail-to-head
- C. Side-to-side
- D. Any of the above

In CML, translocation results in head-to-tail fusion of BCR gene on chromosome 22q11 with ABL gene located on chromosome 9q34.

660 Untreated CML, goes into blast crisis in a median time of ?

Harrison's 18th Ed. 914

- A. 1 year
- B. 2 years
- C. 3 years
- D. 4 years

Untreated CML degenerates from a chronic phase to an accelerated phase & on to blast crisis in a median time of 4 years.

661 ABL proto-oncogene is present on ?

N Engl J Med 2002;346:684

- A. Chromosome 9
- B. Chromosome 22
- C. Chromosome 11
- D. Chromosome 12

Abelson (ABL) proto-oncogene normally located on chromosome 9.

662 Breakpoint cluster region (BCR) gene is present on ?

N Engl J Med 2002;346:684

- A. Chromosome 9
- B. Chromosome 22
- C. Chromosome 11
- D. Chromosome 12

Breakpoint cluster region (BCR) gene is located on chromosome 22.

663 ABL-BCR fusion gene is present on ?

N Engl J Med 2003;349:1451-64

- A. Chromosome 9q+
- B. Chromosome 22
- C. Chromosome 11
- D. Chromosome 12

The classic BCR-ABL gene of CML results from the fusion of parts of two normal genes - ABL gene on chromosome 9 & BCR gene on chromosome 22. Both genes are ubiquitously expressed in normal tissues. Two novel fusion genes are found in CML - BCR-ABL on derivative 22q- (Philadelphia) chromosome and ABL-BCR on chromosome 9q+.

664 ABL-BCR fusion protein is found in ?

N Engl J Med 2003;349:1451-64

- A. Nucleus
- B. Cytoplasm
- C. Cell membrane
- D. Nuclear membrane

ABL proapoptotic protein is found in both nucleus & cytoplasm. Antiapoptotic BCR-ABL is exclusively cytoplasmic.

665 Progression of CML to blast crisis is accelerated by ?

Harrison's 18th Ed. 914

- A. Alcohol ingestion
- B. Cigarette smoking
- C. Exercise

- D. Lack of sleep

Cigarette smoking accelerated the progression of CML to blast crisis.

666 Which of the following about CML is false ?

Harrison's 18th Ed. 914

- A. Reciprocal translocation between chromosomes 9 & 22
- B. Bcr/Abl fusion protein is p210^{BCR/ABL}
- C. Chromosomal instability is a rule
- D. There is direct evidence of a viral etiology

In CML, there is no evidence to suggest a viral etiology. Chromosomal instability of the malignant clone resulting in the acquisition of an additional t(9;22), trisomy 8, or 17p- (TP53 loss) is a fundamental feature of CML.

667 Which of the following is the most common physical finding in CML ?

Harrison's 18th Ed. 915

- A. Splenomegaly
- B. Hepatomegaly
- C. Lymphadenopathy
- D. Bony tenderness

Minimal to moderate splenomegaly is the most common physical finding

668 In CML, presence of which of the following points towards poor prognosis ?

Harrison's 18th Ed. 915

- A. Splenomegaly
- B. Hepatomegaly
- C. Lymphadenopathy
- D. Bony tenderness

Lymphadenopathy & myeloid sarcomas are unusual except late in the course of CML, but when present, indicate a poor prognosis.

669 Which of the following is false about CML ?

Harrison's 18th Ed. 915

- A. Platelet counts are always elevated at diagnosis
- B. Leukocyte alkaline phosphatase is low
- C. Serum vitamin B12 & B12-binding proteins are raised
- D. None of the above

670 In CML, disease acceleration is defined by ?

Harrison's 18th Ed. 915

- A. Increasing anemia
- B. Cytogenetic clonal evolution
- C. Blood or marrow blasts between 10 and 20%, blood or marrow basophils $\geq 20\%$, or platelet count $< 100,000/\mu\text{L}$
- D. All of the above

Disease acceleration is defined by the development of increasing degrees of anemia unaccounted for by bleeding or therapy; cytogenetic clonal evolution; or blood or marrow blasts between 10 and 20%, blood or marrow basophils $\geq 20\%$, or platelet count $< 100,000/\mu\text{L}$.

671 In CML, blast crisis is defined as blood or marrow blasts more than ?

Harrison's 18th Ed. 915

- A. $> 5\%$
- B. $> 10\%$
- C. $> 15\%$

D. > 20 %

Blast crisis is defined as acute leukemia, with blood or marrow blasts 20%. Hyposegmented neutrophils may appear (Pelger-Huet anomaly).

672 Cytogenetic hallmark of CML is ?

Harrison's 18th Ed. 915

- A. t(9;22)
- B. t(12;22)
- C. t(11;14)
- D. t(10;17)

Cytogenetic hallmark of CML is t(9;22)(q34;q11.2).

673 Philadelphia chromosome can be addressed as ?

Harrison's 18th Ed. 915

- A. Shortened chromosome 22 (22q-)
- B. Shortened chromosome 9 (9q-)
- C. Lengthened chromosome 22 (22q+)
- D. Lengthened chromosome 9 (9q+)

Philadelphia chromosome refers to a shortened chromosome 22 (22q-).

674 In classic CML patients, Philadelphia chromosome is present in approximately ?

N Engl J Med 2002;346:684

- A. 75 percent
- B. 85 percent
- C. 95 percent
- D. 100 percent

Ph chromosome is present in ~95 % of patients with classic CML.

675 Ph chromosome is present in ?

N Engl J Med 2002;346:683

- A. All dividing cells of hematopoietic lineage
- B. B cells
- C. T cells
- D. All of the above

Diagnostic hallmark is Ph chromosome, which is present in all dividing cells of hematopoietic lineage, as well as in B and T cells in some patients, but is absent in all other cells.

676 The human genome contains about ?

N Engl J Med 2005;353:172-87

- A. 70 tyrosine kinases (TK)
- B. 80 tyrosine kinases (TK)
- C. 90 tyrosine kinases (TK)
- D. 100 tyrosine kinases (TK)

677 Sokal index staging system in CML includes all except ?

Harrison's 18th Ed. 915

- A. Percentage of circulating blasts
- B. Spleen size
- C. Hemoglobin
- D. Platelet count

678 Sokal index staging system in CML includes all except ?

Harrison's 18th Ed. 915

- A. Cytogenetic clonal evolution

B. Age

C. Sex

D. Percentage of circulating blasts

Sokal index (based on chemotherapy-treated patients) includes percentage of circulating blasts, spleen size, platelet count, age and cytogenetic clonal evolution as the most important prognostic indicators.

679 Hasford staging system in CML does not include which of the following ?

Harrison's 18th Ed. 915

- A. Cytogenetic clonal evolution
- B. Age
- C. Spleen size
- D. Percentage of circulating blasts

Hasford system (based on interferon (IFN) α - treated patients) for CML includes % of circulating blasts, spleen size, platelet count, age & percentage of eosinophils & basophils as prognostic indicators.

680 CML is characterized by ?

N Engl J Med 2002;346:683

- A. Progressive granulocytosis
- B. Marrow hypercellularity
- C. Splenomegaly
- D. All of the above

CML is due to mutation in a pluripotent stem cell and is characterized by progressive granulocytosis, marrow hypercellularity and splenomegaly.

681 In CML treatment, complete hematologic remission means ?

Harrison's 18th Ed. 916 Table 109-5

- A. WBC <10,000 / μ L
- B. Normal blood morphology, hemoglobin & platelet counts
- C. Disappearance of splenomegaly
- D. All of the above

In CML treatment, complete hematologic remission, WBC <10,000/ μ L, normal blood morphology, hemoglobin & platelet counts and disappearance of splenomegaly.

682 In CML treatment, complete cytogenetic remission means ?

Harrison's 18th Ed. 916 Table 109-5

- A. No bone marrow metaphases with t(9;22)
- B. < 10% bone marrow metaphases with t(9;22)
- C. 1 - 35% bone marrow metaphases with t(9;22)
- D. 36 - 85% bone marrow metaphases with t(9;22)

In CML tt., complete cytogenetic remission means no bone marrow metaphases with t(9;22).

683 Which of the following drugs is effective in treatment of CML ?

Harrison's 18th Ed. 916

- A. Imatinib mesylate
- B. IFN- α
- C. Hydroxyurea
- D. All of the above

684 Function of protein kinase enzymes is to transfer ?

N Engl J Med 2002;346:683

- A. Phosphate from ATP to specific amino acids
- B. Adenosine from ATP to specific amino acids
- C. Phosphate & adenosine from ATP to specific amino acids

- D. None of the above

Protein kinases are enzymes that transfer phosphate from adenosine triphosphate to specific amino acids on substrate proteins.

685 Which of the following are subfamilies of protein kinases ?

N Engl J Med 2002;346:683

- A. Protein serine - threonine kinases
- B. Protein tyrosine kinases
- C. A+B
- D. None of the above

Protein kinases are composed of two subfamilies, the protein serine-threonine kinases and the protein tyrosine kinases.

686 Which of the following are protein kinases ?

N Engl J Med 2002;346:686

- A. BCR-ABL
- B. Protein kinase C
- C. Epidermal growth factor receptor
- D. All of the above

687 The tyrosine kinase inhibited by imatinib is ?

N Engl J Med 2002;346:686

- A. c-kit
- B. Epidermal growth factor receptor FLT1
- C. Epidermal growth factor receptor FLT3
- D. All of the above

688 Imatinib mesylate is a specific inhibitor of which of the following TKs ?

N Engl J Med 2002;346:686

- A. ABL, ABL-related gene product (ARG)
- B. c-KIT
- C. PDGF receptor (PDGFR)
- D. All of the above

Imatinib inhibits PDGF receptor, all ABL tyrosine kinases, and c-kit (receptor for stem-cell factor). Tyrosine kinase receptors like epidermal growth factor receptor, FLT1 & FLT3 are unaffected.

689 The proto-oncogene c-kit is expressed in ?

Harrison's 16th Ed. 455

- A. Gastrointestinal stromal tumors
- B. Mast-cell tumors
- C. Neuroblastoma
- D. All of the above

690 Imatinib has effective activity in cases of ?

Harrison's 16th Ed. 455

- A. CML
- B. Gastrointestinal stromal tumors (GIST)
- C. Chronic myelomonocytic leukemia (CMML)
- D. All of the above

691 Imatinib mesylate is most effective in ?

Harrison's 16th Ed. 455

- A. Chronic-phase CML
- B. Accelerated phase CML
- C. Blast-crisis phase CML
- D. All of the above

692 Treatment of CML with Imatinib mesylate is currently recommended for ?

Harrison's 18th Ed. 916

- A. 1 year
- B. 3 years
- C. 5 years
- D. Life long

Treatment of CML with Imatinib mesylate is currently recommended for life.

693 Which of the following statements about Imatinib mesylate is false ?

Harrison's 18th Ed. 916

- A. Imatinib is administered orally
- B. Dose is 400 mg per day
- C. Most common hematologic side effect is myelosuppression
- D. None of the above

694 What dose of Imatinib mesylate is ineffective and may lead to development of resistance ?

Harrison's 18th Ed. 916

- A. < 300 mg / day
- B. < 400 mg / day
- C. < 500 mg / day
- D. < 600 mg / day

<300 mg/day of Imatinib mesylate is ineffective & may lead to development of resistance.

695 Which of the following is the mechanism of resistance to imatinib ?

Harrison's 18th Ed. 916

- A. Gene amplification
- B. Mutations at the kinase site
- C. Enhanced expression of multidrug exporter proteins
- D. All of the above

Four mechanisms of resistance to imatinib are gene amplification, mutations at the kinase site, enhanced expression of multidrug exporter proteins and alternative signaling pathways functionally compensating for the imatinib-sensitive mechanisms.

696 CML with the T315I mutation is resistant to ?

Harrison's 18th Ed. 916

- A. Imatinib
- B. Nilotinib
- C. Dasatinib
- D. All of the above

CML with the T315I mutation is resistant to imatinib, nilotinib, and dasatinib. Nilotinib is also resistant to E255K/V & Y253F/H while dasatinib is also resistant to X299L & F317L.

697 Therapy with which of the following in CML does not induce cytogenetic remission ?

Harrison's 18th Ed. 918

- A. Imatinib mesylate
- B. IFN- α
- C. Hydroxyurea
- D. All of the above

Cytogenetic remissions with hydroxyurea are uncommon.

698 Therapy with which of the following in CML does not induce rapid hematologic responses ?

N Engl J Med 2002;346:687

- A. Imatinib mesylate
- B. IFN- α
- C. Hydroxyurea
- D. All of the above

Chapter 110. Malignancies of Lymphoid Cells

699 What was the first name of Hodgkin ?

N Engl J Med 2010;363:653-62

- A. Micheal
- B. John
- C. Clarke
- D. Thomas

Sir Thomas Hodgkin presented seven autopsy cases in his famous paper "On some morbid appearances of the absorbent glands and spleen" to the Royal Medical and Chirurgical Society of London on January 10 and 24, 1832. In 1898 and 1902, Carl Sternberg and Dorothy Reed independently described the typical "diagnostic" cells. In 1944, Jackson and Parker proposed the first comprehensive classification of the tumour.

700 Ann Arbor staging system for Hodgkin's Disease was made in which year ?

N Engl J Med 2010;363:653-62

- A. 1951
- B. 1961
- C. 1971
- D. 1981

The concept of staging Hodgkin's lymphoma was made at the Ann Arbor Conference in 1971.

701 Which of the following statements about Hodgkin's Disease is false ?

Harrison's 18th Ed. 934

- A. Disease not increasing in frequency
- B. Most patients present with palpable lymphadenopathy
- C. Subdiaphragmatic presentation is unusual
- D. None of the above

Hodgkin's disease does not appear to be increasing in frequency. Most patients present with palpable lymphadenopathy (contiguous, nontender, in neck, supraclavicular area, and axilla). 50% patients will have mediastinal adenopathy at diagnosis. Subdiaphragmatic presentation of Hodgkin's disease is unusual and more common in older males.

702 Unusual manifestations of Hodgkin's disease include ?

Harrison's 18th Ed. 934

- A. Erythema nodosum
- B. Paraneoplastic cerebellar degeneration
- C. Pain in lymph nodes on alcohol ingestion
- D. All of the above

Hodgkin's disease can present with unusual manifestations that are severe & unexplained itching, erythema nodosum, ichthyosiform atrophy, paraneoplastic cerebellar degeneration, nephrotic syndrome, immune hemolytic anemia, thrombocytopenia, hypercalcemia, and pain in lymph nodes on alcohol ingestion.

703 Which of the following about Pel and Ebstein is false ?

- A. Their names were Wilhelm Ebstein and P.K. Pel

- B. Both published papers in in the same journal in 1887 about fever in Hodgkin's disease
- C. Long-term dispute persisted between Pel & Ebstein on the etiology of Hodgkin's disease
- D. None of the above

Pel-Ebstein fever is named after Wilhelm Ebstein & P.K. Pel who both published papers in 1887 in the same journal, though Pel published first by several months. A long-term dispute persisted between Pel and Ebstein on the etiology of the condition.

704 Most patients of Hodgkin's disease have which of the following ?

Harrison's 18th Ed. 934

- A. Mixed-cellularity Hodgkin's disease
- B. Nodular sclerosing Hodgkin's disease
- C. Lymphocyte-predominant Hodgkin's disease
- D. Lymphocyte-depleted Hodgkin's disease

In the US, most patients have nodular sclerosing Hodgkin's disease. Lymphocyte-predominant and lymphocyte-depleted Hodgkin's disease are rare. Mixed-cellularity Hodgkin's disease or lymphocyte-depletion Hodgkin's disease are seen more frequently in patients infected by HIV.

705 Nucleus in Reed-Sternberg cell is also described as ?

Harrison's 18th Ed. 934 Figure 110-11

- A. "Owl's eyes" appearance
- B. "Spectacle" appearance
- C. "Ghost" appearance
- D. "Moon" appearance

A Reed-Sternberg cell is present near the center of the field; a large cell with a bilobed nucleus and prominent nucleoli giving an "owl's eyes" appearance.

706 What is the diameter of Reed-Sternberg (RS) cells ?

J Clin Pathol 2002;55:162-176

- A. 5 - 10 μ m
- B. 8 - 16 μ m
- C. 12 - 20 μ m
- D. 20 - 60 μ m

Reed-Sternberg (RS) measure 20 - 60 μ m in diameter and display a large rim of cytoplasm and at least two nuclei with acidophilic or amphophilic nucleoli, covering more than 50% of the nuclear area.

707 Reed-Sternberg (RS) cells are seen in ?

J Clin Pathol 2002;55:162-176

- A. Infectious mononucleosis
- B. B and T cell lymphomas
- C. Melanomas
- D. All of the above

RS cells are not exclusive to HL because similar elements can be seen in reactive lesions (infectious mononucleosis), B & T cell lymphomas, carcinomas, melanomas, and sarcomas.

708 Which of the following is false about classic Hodgkin's disease ?

J Clin Pathol 2002;55:162-176

- A. Typical bimodal age distribution
- B. One peak at 10 - 35 years of age
- C. Second peak in late life
- D. None of the above

Classic Hodgkin's disease has a typical bimodal age distribution, with a peak at 10 - 35 years of age and a second peak in late life.

709 Hodgkin's disease is related to ?*Harrison's 18th Ed. 934*

- A. Neoplastic cells of B cell origin
- B. Polyclonal inflammatory infiltrate
- C. Monoclonal antibody Ki-1 reactivity to RS cells
- D. All of the above

Hodgkin's disease is a tumor characterized by rare neoplastic cells of germinal centre B cell origin in a tumor mass with largely polyclonal inflammatory infiltrate. Monoclonal antibody Ki-1 has reactivity restricted to RS cells. Expression of the CD30 molecule by RS cells is seen in more than 98% of classical Hodgkin's disease. CD15 is a valuable marker for RS cells and is detected in ~80% of patients with classical Hodgkin's disease. RS cells usually lack CD45 and epithelial membrane antigen (EMA) expression.

710 Which of the following chemotherapy regimens is used in Hodgkin's disease ?*Harrison's 18th Ed. 934*

- A. ABVD
- B. MOPP
- C. BEACOPP
- D. All of the above

Chemotherapy regimens used in Hodgkin's disease include ABVD (doxorubicin, bleomycin, vinblastine, and dacarbazine), MOPP (mechlorethamine, vincristine, procarbazine, and prednisone), and BEACOPP (bleomycin, cyclophosphamide, doxorubicin, etoposide, prednisone, procarbazine, and vincristine).

Chapter 111. Plasma Cell Disorders

711 Multiple myeloma is also known as ?

- A. Kahler's disease
- B. Strohl's disease
- C. Kayle's disease
- D. Migasha disease

*After Otto Kahler.***712 Which of the following is not a plasma cell disorder ?***Harrison's 18th Ed. 936*

- A. Multiple myeloma
- B. Waldenstrom's macroglobulinemia
- C. Primary amyloidosis
- D. Light chain diseases

Plasma cell disorders also called monoclonal gammopathies or paraproteinemias or plasma cell dyscrasias or dysproteinemias comprise of Multiple myeloma, Waldenström's macroglobulinemia, Primary amyloidosis & Heavy chain diseases.

713 Multiple myeloma originates from ?*N Engl J Med 2011;364:1046-60*

- A. Post - germinal center B cell
- B. Post - germinal center T cell
- C. Pre - germinal center B cell
- D. Pre - germinal center T cell

Myeloma arises from an asymptomatic premalignant proliferation of monoclonal plasma cells that are derived from post-germinal-center B cells. Myeloma evolves mostly from a monoclonal gammopathy of undetermined clinical significance (MGUS) that progresses to smoldering myeloma and, finally, to symptomatic myeloma.

714 Which of the following secondary translocations are common in multiple myeloma but rare in MGUS ?*N Engl J Med 2011;364:1046-60*

- A. MYC (8q24)
- B. MAFB (20q12)
- C. IRF4 (6p25)
- D. All of the above

Secondary translocations involving MYC (8q24), MAFB (20q12), and IRF4 (6p25) are common in multiple myeloma but rare in MGUS.

715 Which of the following genetic abnormalities are found in multiple myeloma ?*N Engl J Med 2011;364:1046-60*

- A. Mutations of RAS or FGFR3
- B. MYC dysregulation
- C. Loss of expression or mutation in TP53
- D. All of the above

Mutations of RAS or FGFR3, MYC dysregulation, deletion in p18, or loss of expression or mutation in TP53 are found only in multiple myeloma and play a key role in determining tumor progression and drug resistance.

716 Which of the following about Plasma Cell Disorders is false ?*Harrison's 18th Ed. 936*

- A. Monoclonal neoplasms
- B. Progenitors in B lymphocyte lineage
- C. Manifest clinically by expansion of neoplastic cells
- D. None of the above

Plasma cell disorders are monoclonal neoplasms, develop from common progenitors in B lymphocyte lineage. Their clinical manifestations are due to expansion of neoplastic cells, to secretion of cell products (immunoglobulin molecules or subunits, lymphokines), and to host's response to the tumor.

717 Which of the following is not a heavy chain isotype of immunoglobulin molecule ?*Harrison's 18th Ed. 936*

- A. A
- B. D
- C. M
- D. N

There are 5 heavy chain isotypes (M, G, A, D, E) & two light chain isotypes (kappa & lambda).

718 Antibody molecule is composed of ?*Harrison's 18th Ed. 936*

- A. 2 heavy chains and 2 light chains
- B. 2 heavy chains and 1 light chain
- C. 1 heavy chain and 2 light chains
- D. Any of the above

Antibody molecules are composed of two heavy chains (mol wt ~ 50,000) and two light chains (mol wt ~ 25,000).

719 Antigenic determinants formed by the unique structure of the antigen-binding portion of the molecule are called ?*Harrison's 18th Ed. 936*

- A. Isotypes
- B. Allotypes
- C. Idiotypes
- D. None of the above

Isotypes are those antigenic determinants that distinguish among the main classes of antibodies of a given species and are the same in all normal individuals of that species. Allotypes are distinct

determinants that reflect regular small differences between individuals of the same species in the amino acid sequences of otherwise similar immunoglobulins. These differences are determined by allelic genes; by definition, they are detected by antibodies made in the same species. Idiotypes are unique to the molecules produced by a given clone of antibody-producing cells. Idiotypes are formed by the unique structure of the antigen-binding portion of the molecule.

720 Immunoglobulins constitute what percentage of plasma proteins ?

- A. 2 %
- B. 5 %
- C. 10 %
- D. 20 %

Immunoglobulins (Ig) have molecular weights between 160,000 and 970,000. They usually constitute about 20 per cent of all the plasma proteins.

721 Light & heavy chains in antibody molecule are linked by ?

Harrison's 18th Ed. 936

- A. Phosphate bond
- B. Disulfide bond
- C. Sulphar bond
- D. Any of the above

The light and heavy chains are linked by disulfide bonds.

722 Normally, quantity of light chains excreted daily by kidney is ?

Harrison's 18th Ed. 936

- A. < 10 mg
- B. < 20 mg
- C. < 30 mg
- D. < 40 mg

<10 mg of free light chains secreted by plasma cells is excreted by kidney per day.

723 In serum electrophoresis, immunoglobulins form a broad peak in ?

Harrison's 18th Ed. 936

- A. Alpha region
- B. Beta region
- C. Gamma region
- D. Delta region

Immunoglobulins move heterogeneously in electric field & form a broad peak in gamma region.

724 "M" in M component stands for ?

Harrison's 18th Ed. 936

- A. Myeloma
- B. Monocomponent
- C. Monoclonal
- D. Miscellaneous

M stands for monoclonal. M component is a tumor marker.

725 In serum electrophoresis, the antibody must be present at what concentration to be detectable ?

Harrison's 18th Ed. 936

- A. 0.3 g / dL
- B. 0.4 g / dL
- C. 0.5 g / dL
- D. 0.6 g / dL

Antibody must be present at a concentration of at least 0.5 gram/dL to be detectable by immunoelectrophoresis. This corresponds to $\sim 10^9$ cells producing the antibody.

726 In electrophoretic analysis, M component may be detected in ?

Harrison's 18th Ed. 936

- A. Plasma cell disorders
- B. Chronic lymphocytic leukemia
- C. Chronic myeloid leukemia
- D. All of the above

727 In electrophoretic analysis, M component may be detected in ?

Harrison's 18th Ed. 936

- A. Plasma cell disorders
- B. Breast cancer
- C. Colon cancer
- D. All of the above

728 In electrophoretic analysis, M component may be detected in ?

Harrison's 18th Ed. 936

- A. Cirrhosis
- B. Sarcoidosis
- C. Gaucher disease
- D. All of the above

729 In electrophoretic analysis, M component may be detected in ?

Harrison's 18th Ed. 936

- A. Rheumatoid arthritis
- B. Myasthenia gravis
- C. Lichen myxedematosus
- D. All of the above

In addition to the plasma cell disorders, M components may be detected in chronic lymphocytic leukemia, lymphomas of B or T cell origin, chronic myeloid leukemia, breast cancer, and colon cancer, cirrhosis, sarcoidosis, parasitic diseases, Gaucher disease, and pyoderma gangrenosum, rheumatoid arthritis, myasthenia gravis, cold agglutinin disease, lichen myxedematosus, and necrobiotic xanthogranuloma.

730 In serum electrophoresis, church spire sharp peak is seen in ?

Harrison's 18th Ed. 937 Figure 111-1

- A. Normal individuals
- B. Polyclonal immunoglobulinopathy
- C. Monoclonal gammopathy
- D. None of the above

In monoclonal gammopathies, the predominance of a product of a single cell produces a "church spire" sharp peak, usually in the globulin region.

731 M component is composed of ?

Harrison's 18th Ed. 936

- A. Intact antibody molecule of any heavy chain subclass
- B. Altered antibody
- C. Antibody fragment
- D. Any of the above

M component may be an intact antibody molecule of any heavy chain subclass, or it may be an altered antibody or fragment.

732 Bence Jones protein in urine of myeloma patients represents ?

Harrison's 18th Ed. 936

- A. Light chains
- B. Heavy chains
- C. Altered antibody

- D. Any of the above

In ~20% of myelomas, only light chains are produced and in most cases are secreted in the urine as Bence Jones proteins.

733 Which is the most common form of myeloma ?

Harrison's 18th Ed. 937

- A. IgG myeloma
- B. IgA myeloma
- C. IgD myeloma
- D. None of the above

The frequency of myelomas of a particular heavy chain class is roughly proportional to the serum concentration, and therefore IgG myelomas are more common than IgA and IgD myelomas.

734 Plasma cells are produced in ?

- A. Lymph glands
- B. Spleen
- C. Thymus
- D. All of the above

Lymphocytes and plasma cells are produced mainly in lymphogenous tissues like lymph glands, spleen, thymus, tonsils, and Peyer's patches.

735 Which of the following interleukins are called B-cell stimulating factors or B-cell growth factors ?

- A. 4
- B. 5
- C. 6
- D. All of the above

Interleukins 4, 5, and 6 participate in the B-cell response and have such potent effects on B cells that they have been called B-cell stimulating factors or B-cell growth factors.

736 Which of the following interleukins may play a role in driving myeloma cell proliferation ?

Harrison's 18th Ed. 937

- A. 1
- B. 2
- C. 4
- D. 6

Interleukin (IL)-6 may play a role in driving myeloma cell proliferation.

737 Most common translocation in multiple myeloma is ?

Harrison's 18th Ed. 937, N Engl J Med 2011;364:1046-60

- A. t(10;14)
- B. t(11;14)
- C. t(12;14)
- D. t(13;14)

The most common translocations in multiple myeloma are t(11;14)(q13;q32) and t(4;14)(p16;q32). Specific translocations in the immunoglobulin heavy chain region that are detected on fluorescence in situ hybridization (FISH), such as t(4;14), deletion 17p13, and chromosome 1 abnormalities, are associated with a poor prognosis. High risk disease and poor prognosis are defined by the presence of one of the following in each category: hypodiploidy, t(4;14), or deletion 17p13; high levels of serum β 2-microglobulin or lactate dehydrogenase; and International Staging System stage III. Standard-risk disease is defined by the presence of hyperdiploidy or t(11;14), normal levels of serum β 2-microglobulin or lactate dehydrogenase, and International Staging System stage I.

738 In Stage III of International Staging System for Multiple Myeloma, β 2-microglobulin levels is more than ?

Harrison's 18th Ed. 941 Table 111-3, N Engl J Med 2011;364:1046-60

- A. 2.5 mg / liter

- B. 3.5 mg / liter
- C. 4.5 mg / liter
- D. 5.5 mg / liter

739 Which of the following about myeloma is false ?

Harrison's 18th Ed. 937, N Engl J Med 2009;360:2645-54

- A. Rare under the age of 40 years
- B. Median age at diagnosis is 70 years
- C. More common in males than females
- D. None of the above

Myeloma is uncommon under age 40, increases in incidence with age. Median age at diagnosis is 70 years. It does not occur in children. Males are more commonly affected than females.

740 Drug resistance in multiple myeloma is mediated by ?

Harrison's 18th Ed. 938

- A. Ras/Raf/mitogen-activated protein kinase
- B. PI3-K/Akt
- C. Protein kinase C signaling cascades
- D. None of the above

Growth, drug resistance, and migration in multiple myeloma are mediated via Ras/Raf/mitogen-activated protein kinase, PI3-K/Akt, and protein kinase C signaling cascades, respectively.

741 Which of the following is not a feature of myeloma cells in bone marrow ?

Harrison's 18th Ed. 937 Figure 111-2

- A. Round or oval shape
- B. Eccentric nucleus with coarsely clumped chromatin
- C. Densely eosinophilic cytoplasm
- D. Perinuclear clear zone containing Golgi apparatus

Myeloma cells in bone marrow are round or oval cells in shape, with eccentric nucleus having coarsely clumped chromatin, a densely basophilic cytoplasm, and a perinuclear clear zone (hof) containing Golgi apparatus.

742 Which of the following about bone pain in myeloma is false ?

Harrison's 18th Ed. 938

- A. Affects ~ 70% of patients
- B. Located to back and ribs
- C. Precipitated by movement
- D. Worse at night

Bone pain is the most common symptom in myeloma, affecting nearly 70% of patients. Pain usually involves the back and ribs, and unlike the pain of metastatic carcinoma, which often is worse at night, the pain of myeloma is precipitated by movement. Persistent localized pain in a patient with myeloma usually signifies a pathologic fracture.

743 Which of the following about bony lesions in myeloma is false ?

Harrison's 18th Ed. 938

- A. Due to bony destruction by osteoclasts
- B. Suppression of osteoblastic new bone formation
- C. Serum alkaline phosphatase is usually normal
- D. None of the above

Bone lesions of myeloma are caused by proliferation of tumor cells, activation of osteoclasts that destroy bone & suppression of osteoblasts that form new bone. Serum alkaline phosphatase is normal even with extensive bone involvement because of the absence of osteoblastic activity.

744 Osteoclast activating factors (OAF) from myeloma cells are mediated by ?

Harrison's 18th Ed. 938, N Engl J Med 2011;364:1046-60

- A. IL-1

- B. Receptor activator of NF-κB (RANK) ligand
- C. Tumor necrosis factor (TNF)
- D. All of the above

Osteoclasts are activated by osteoclast activating factors (OAF) from myeloma cells. OAF activity is mediated by IL-1, lymphotoxin, VEGF, receptor activator of NF-κB (RANK) ligand, macrophage inhibitory factor (MIP)-1α, & TNF. Bone lesions are caused by an imbalance in the function of osteoblasts and osteoclasts. The inhibition of the Wnt pathway suppresses osteoblasts, whereas the amplification of the RANK pathway and the action of macrophage inflammatory protein 1 α (MIP1α) activate osteoclasts.

- 745 Dickhoff-1 (DKK-1) produced by myeloma cells causes ?**
Harrison's 18th Ed. 938, Figure 111-4
- A. Osteoclastic activation
 - B. Osteoblastic suppression
 - C. Osteoclastic suppression
 - D. Osteoblastic activation

Bone lesions are lytic in nature and are rarely associated with osteoblastic new bone formation due to their suppression by dickhoff-1 (DKK-1) produced by myeloma cells. Multiple myeloma lesion represents a purely osteolytic lesion with little or no osteoblastic activity.

- 746 In multiple myeloma, localized bone lesions may be palpated on ?**
Harrison's 18th Ed. 938
- A. Skull
 - B. Clavicles
 - C. Sternum
 - D. All of the above

Localized bone lesions in multiple myeloma may cause mass lesions that may be palpated on the skull, clavicles, and sternum. The collapse of vertebrae may lead to spinal cord compression.

- 747 In myeloma, most common infection is ?**
Harrison's 18th Ed. 938
- A. Osteomyelitis
 - B. Otitis
 - C. Cholecystitis
 - D. Pyelonephritis

In myeloma, most common infections are pneumonias and pyelonephritis.

- 748 In myeloma, the most frequent pathogen in lungs is ?**
Harrison's 18th Ed. 938
- A. Pseudomonas aeruginosa
 - B. Klebsiella pneumoniae
 - C. Haemophilus influenzae
 - D. Legionella pneumophila

In myeloma, most frequent pathogens are Streptococcus pneumoniae, Staphylococcus aureus, and Klebsiella pneumoniae in the lungs and Escherichia coli in urinary tract.

- 749 Immune deficiency in myeloma patients is due to ?**
Harrison's 18th Ed. 938
- A. Diffuse hypogammaglobulinemia
 - B. Low granulocyte lysozyme content
 - C. Abnormalities in complement functions
 - D. All of the above

- 750 Renal failure in myeloma patients is mainly due to ?**
Harrison's 18th Ed. 938
- A. Recurrent Infections

- B. Hypercalcemia
- C. Hyperuricemia
- D. Infiltration of kidney by myeloma cells

Hypercalcemia is the most common cause of renal failure. Excretion of light chains is almost always present that causes tubular damage either directly from light chain toxic effects or indirectly from the release of intracellular lysosomal enzymes.

- 751 The earliest manifestation of tubular damage in MM is ?**
Harrison's 18th Ed. 938
- A. Medullary cystic kidney disease
 - B. Adult Fanconi syndrome
 - C. Nephronophthisis
 - D. All of the above

In MM, earliest manifestation of tubular damage is adult Fanconi syndrome (a type 2 proximal renal tubular acidosis), with loss of glucose & amino acids, along with defects in the ability of kidney to acidify & concentrate urine.

- 752 Which of the following regarding renal failure in myeloma patients is false ?**
Harrison's 18th Ed. 938
- A. Protein in urine is nearly all light chains
 - B. Proteinuria is not accompanied by hypertension
 - C. Susceptible to acute renal failure if dehydrated
 - D. None of the above

- 753 Anion gap in patients with myeloma is ?**
Harrison's 18th Ed. 939
- A. Increased
 - B. Decreased
 - C. Normal
 - D. Any of the above

Patients with myeloma have a decreased anion gap because M component is cationic, resulting in retention of chloride.

- 754 Which of the following is false about anemia in myeloma patients ?**
Harrison's 18th Ed. 939
- A. Normocytic, normochromic
 - B. Granulocytopenia very rare
 - C. Thrombocytopenia very rare
 - D. None of the above

Normocytic & normochromic anemia occurs in 80% of myeloma patients. It is due to replacement of normal marrow by expanding tumor cells, to inhibition of hematopoiesis by factors made by the tumor, and to reduced production of erythropoietin by kidney. Granulocytopenia and thrombocytopenia are very rare.

- 755 Normal relative serum viscosity is ?**
Harrison's 18th Ed. 939
- A. 1.2
 - B. 1.4
 - C. 1.6
 - D. 1.8

Normal relative serum viscosity is 1.8 (i.e., serum is normally almost twice as viscous as water).

- 756 Symptoms of hyperviscosity occur at a level of ?**
Harrison's 18th Ed. 939
- A. 1 to 2

- B. 3 to 4
- C. 4 to 5
- D. 5 to 6

Symptoms of hyperviscosity occur at a level of 5 - 6, a level usually reached at paraprotein concentrations of ~4 g/dL for IgM, 5 g/dL for IgG3, & 7 g/dL for IgA.

757 Hyperviscosity may lead to which of the following ?

Harrison's 18th Ed. 940

- A. Headache
- B. Visual disturbances
- C. Retinopathy
- D. All of the above

Hyperviscosity may lead to headache, fatigue, visual disturbances, and retinopathy.

758 In myeloma, which of the following paraproteins leads to hyperviscosity ?

Harrison's 18th Ed. 940

- A. IgM
- B. IgG3
- C. IgA
- D. All of the above

Most commonly, IgM, IgG3, and IgA paraproteins of the M component favour development of hyperviscosity syndromes.

759 Hyperviscosity is most common with which of the following paraproteins ?

Harrison's 18th Ed. 941

- A. IgA
- B. IgG
- C. IgD
- D. IgM

About half of patients with IgM paraproteins develop hyperviscosity compared with only 2 - 4% of patients with IgA and IgG M components.

760 Hyperviscosity is most common with which of the following IgG subclass paraproteins ?

Harrison's 18th Ed. 941

- A. IgG1
- B. IgG2
- C. IgG3
- D. IgG4

Among IgG myelomas, it is IgG3 subclass that has the highest tendency to form both concentration- and temperature-dependent aggregates, leading to hyperviscosity and cold agglutination at lower serum concentrations.

761 Sensory neuropathy occurs in which of the following ?

Harrison's 18th Ed. 940

- A. Multiple myeloma
- B. Monoclonal gammopathy of undetermined significance
- C. Thalidomide & Bortezomib therapy
- D. All of the above

Neuropathy associated with monoclonal gammopathy of undetermined significance (MGUS) and myeloma is more frequently sensory than motor neuropathy and is associated with IgM more than other isotypes. Sensory neuropathy is also a side effect of thalidomide & bortezomib therapy.

762 Myeloma causes enlargement of which of the following ?

Harrison's 18th Ed. 940

- A. Spleen
- B. Lymph nodes
- C. Gut-associated lymphatic tissue
- D. None of the above

In myeloma, tumor expansion is dominantly in bone & bone marrow and rarely causes enlargement of spleen, lymph nodes or gut-associated lymphatic tissue.

763 The classic triad of myeloma consists of all except ?

Harrison's 18th Ed. 940

- A. Marrow plasmacytosis (>10%)
- B. Bence Jones proteins in urine
- C. Lytic bone lesions
- D. Serum and/or urine M component

The classic triad of myeloma is marrow plasmacytosis (>10%), lytic bone lesions, and a serum and/or urine M component.

764 Bone marrow plasma cells are ?

Harrison's 18th Ed. 940, 943

- A. CD130+
- B. CD134+
- C. CD138+
- D. CD142+

Bone marrow plasma cells are CD138+ and monoclonal. Diagnosis of IgM myeloma is reserved for patients with lytic bone lesions & predominant infiltration with CD138+ plasma cells in bone marrow.

765 What percentage of patients with MGUS go on to develop myeloma ?

Harrison's 18th Ed. 940

- A. ~ 1 % per year
- B. ~ 2 % per year
- C. ~ 3 % per year
- D. ~ 4 % per year

With long-term follow-up, ~1% per year of patients with MGUS go on to develop myeloma.

766 Which of the following statements about myeloma is false ?

Harrison's 18th Ed. 940

- A. All myeloma is preceded by MGUS
- B. Serum alkaline phosphatase is normal
- C. Dipsticks for detecting proteinuria not reliable for light chains
- D. None of the above

Serum alkaline phosphatase is usually normal even with extensive bone involvement because of the absence of osteoblastic activity.

767 Which of the following factor is associated with higher incidence of progression of MGUS to myeloma ?

Harrison's 18th Ed. 940

- A. Non-IgG subtype
- B. Abnormal kappa/lambda free light chain ratio
- C. Serum M protein > 1.5 g/dL
- D. All of the above

Non-IgG subtype, abnormal kappa/lambda free light chain ratio, and serum M protein > 15 g/L (1.5 g/dL) are associated with higher incidence of progression of MGUS to myeloma.

768 Extramedullary plasmacytoma usually involves ?

Harrison's 18th Ed. 940

- A Lung-associated lymphatic tissue
- B Gut-associated lymphatic tissue
- C Submucosal lymphoid tissue of nasopharynx or sinuses
- D Any of the above

Extramedullary plasmacytomas usually involve the submucosal lymphoid tissue of the nasopharynx or paranasal sinuses without marrow plasmacytosis.

769 Which of the following is a Myeloma staging system ?

Harrison's 18th Ed. 940

- A Ann Arbor staging system
- B Binet staging system
- C RAI staging system
- D Durie-Salmon staging system

Durie-Salmon staging system is based on Hb, calcium, M component & degree of skeletal involvement.

770 What other parameter besides serum β_2 -microglobulin is used in International Staging System (ISS) for myeloma ?

Harrison's 18th Ed. 941

- A Serum albumin
- B Hemoglobin
- C Serum calcium
- D Serum creatinine

Serum β_2 -microglobulin and albumin levels are the basis for the three-stage International Staging System (ISS).

771 All of the following is true for monoclonal gammopathies of uncertain significance (MGUS) except ?

Harrison's 18th Ed. 940

- A < 10% bone marrow plasma cells
- B < 3 g/dL of M components
- C Urinary Bence Jones protein
- D No bone lesions

Diagnostic Criteria for MGUS are M protein in serum < 3 g/dL, bone marrow clonal plasma cells < 10%, no evidence of other B cell proliferative disorders, no myeloma-related organ or tissue impairment (no bone lesions)

772 In MGUS, which is the most common immunoglobulin affected ?

N Engl J Med 2006;355:2765-70

- A IgG
- B IgM
- C IgA
- D Biclonal gammopathies

Serum M component is IgG in 53% of patients, IgA in 25%, and IgD in 1%. 20% of patients have only light chains in serum and urine.

773 The normal free light-chain (κ/λ) ratio is ?

N Engl J Med 2006;355:2765-70

- A 0.06 to 0.65
- B 0.12 to 0.95
- C 0.26 to 1.65
- D 1.86 to 2.35

774 For diagnosis of myeloma, marrow plasmacytosis must be ?

Harrison's 18th Ed. 940

- A > 5 %

- B > 10 %
- C > 15 %
- D > 20 %

775 For diagnosis of myeloma, which of the following are included ?

Harrison's 18th Ed. 940

- A Hemoglobin
- B Serum calcium & degree of skeletal involvement
- C M component
- D All of the above

776 Which of the following is associated with poor prognosis in a patient of myeloma ?

Harrison's 18th Ed. 941

- A Elevated levels of IL-6
- B High labeling index
- C High levels of lactate dehydrogenase
- D All of the above

Besides the above three, other factors may influence prognosis in myeloma patients like : number of cytogenetic abnormalities, % plasma cells in marrow, circulating plasma cells, performance status, serum levels of soluble IL-6 receptor, C-reactive protein, hepatocyte growth factor, C-terminal cross-linked telopeptide of collagen I, transforming growth factor (TGF), and syndecan-1.

777 In myeloma, which of the following is the single most powerful predictor of survival and can substitute for staging ?

Harrison's 18th Ed. 941

- A Serum Beta₂-microglobulin
- B Lactate dehydrogenase
- C Thymidine kinase
- D % plasma cells in marrow

778 In myeloma, which of the following is the single most powerful predictor of survival and can substitute for staging ?

Harrison's 18th Ed. 941

- A Serum Beta₂-microglobulin
- B Serum levels of IL-6 & Soluble IL-6 receptors
- C C-reactive protein
- D Hepatocyte growth factor

779 In myeloma, which of the following is the single most powerful predictor of survival and can substitute for staging ?

Harrison's 18th Ed. 941

- A Serum Beta₂-microglobulin
- B C-terminal cross-linked telopeptide of collagen I
- C TGF-beta
- D Syndecan-1

Serum β_2 -microglobulin is the single most powerful predictor of survival and can substitute for staging. Beta-2 microglobulin is a surrogate marker for the overall body tumor burden.

780 Which of the following drugs is useful in treatment of myeloma ?

Harrison's 18th Ed. 941

- A Vincristine
- B Doxorubicin
- C Melphalan
- D All of the above

781 Which of the following drug must not be used in myeloma patients who are transplant candidates ?

Harrison's 18th Ed. 941

- A. Melphalan
- B. Thalidomide
- C. High-dose pulsed glucocorticoids
- D. Bortezomib

In myeloma patients who are transplant candidates, alkylating agents like melphalan should be avoided as they damage stem cells, leading to decreased ability to collect stem cells for autologous transplant.

782 Dexamethasone is recommended with which of the following drugs for treatment of myeloma ?

Harrison's 18th Ed. 941

- A. Vincristine, doxorubicin
- B. Lenalidomide
- C. Bortezomib
- D. All of the above

In myeloma treatment, dexamethasone with bortezomib, lenalidomide or thalidomide leads to high response rates without compromising collection of stem cells for transplantation.

783 Lenalidomide and/or bortezomib target which of the following ?

Harrison's 18th Ed. 941

- A. Tumor cell
- B. Tumor cell - bone marrow interaction
- C. Bone marrow milieu
- D. All of the above

Lenalidomide & bortezomib target tumor cell, tumor cell - bone marrow interaction & bone marrow milieu.

784 Hematologic diseases causing massive splenomegaly and anemia with absent hyperviscosity include ?

N Engl J Med 2001;345:682

- A. Chronic myeloid leukemia
- B. Agnogenic myeloid metaplasia (with myelofibrosis)
- C. Chronic lymphocytic leukemia or its polymphocytic variant
- D. All of the above

785 Hematologic diseases causing massive splenomegaly and anemia with absent hyperviscosity include ?

N Engl J Med 2001;345:682

- A. Hodgkin's disease
- B. Heavy-chain diseases
- C. Amyloidosis (associated with plasma-cell dyscrasias)
- D. All of the above

786 Hematologic diseases causing massive splenomegaly and anemia with hyperviscosity include all except ?

N Engl J Med 2001;345:682

- A. Polycythemia vera
- B. Multiple myeloma
- C. Heavy-chain diseases
- D. POEMS syndrome

787 Hematologic diseases causing massive splenomegaly and anemia with hyperviscosity include all except ?

N Engl J Med 2001;345:682

- A. Waldenström's macroglobulinemia

- B. Chronic myeloid leukemia
- C. Polycythemia vera
- D. Multiple myeloma

788 Hematologic diseases causing massive splenomegaly, anemia and hyperviscosity include all except ?

N Engl J Med 2001;345:682

- A. Polycythemia vera
- B. Heavy-chain diseases
- C. POEMS syndrome
- D. Waldenström's macroglobulinemia

789 Hematologic diseases causing massive splenomegaly, anemia and hyperviscosity include all except ?

N Engl J Med 2001;345:682

- A. Polycythemia vera
- B. Multiple myeloma
- C. POEMS syndrome
- D. Hodgkin's disease

790 Hematologic diseases causing massive splenomegaly, anemia and without hyperviscosity include all except ?

N Engl J Med 2001;345:682

- A. Chronic myeloid leukemia
- B. Agnogenic myeloid metaplasia (with myelofibrosis)
- C. POEMS syndrome
- D. Chronic lymphocytic leukemia

791 Hematologic diseases causing massive splenomegaly, anemia and without hyperviscosity include all except ?

N Engl J Med 2001;345:682

- A. Waldenström's macroglobulinemia
- B. Hodgkin's disease
- C. Heavy-chain diseases
- D. Amyloidosis (associated with plasma-cell dyscrasias)

792 Causes of massive splenomegaly include all except ?

N Engl J Med 2001;345:682

- A. Gaucher's disease
- B. Niemann-Pick disease
- C. Leishmaniasis
- D. Toxoplasmosis

793 Diseases that can cause "massive splenomegaly" are ?

N Engl J Med 2001;345:682

- A. Chronic malaria
- B. Kala-azar
- C. Leishmaniasis
- D. All of the above

794 Which of the following diseases can cause "massive splenomegaly" ?

Harrison's 16th Ed. 347

- A. Gaucher disease
- B. Hairy cell leukemia
- C. Polycythemia vera
- D. All of the above

795 Which of the following statements about Waldenström's macroglobulinemia is false ?

Harrison's 18th Ed. 942

- A. Lymphoplasmacytoid malignancy secreting IgM
- B. Hepatosplenomegaly & lymphadenopathy common
- C. Hyperviscosity syndrome common
- D. None of the above

796 Waldenström's Macroglobulinemia resembles which of the following diseases ?

Harrison's 18th Ed. 942

- A. Chronic lymphocytic leukemia
- B. Myeloma
- C. Lymphocytic lymphoma
- D. All of the above

Waldenström's Macroglobulinemia resembles related diseases like chronic lymphocytic leukemia, myeloma, and lymphocytic lymphoma.

797 Waldenström's Macroglobulinemia originates from ?

Harrison's 18th Ed. 942

- A. Post - germinal center B cell
- B. Post - germinal center T cell
- C. Pre - germinal center B cell
- D. Pre - germinal center T cell

Waldenström's Macroglobulinemia originates from a post-germinal center B cell that has undergone somatic mutations & antigenic selection in lymphoid follicle and has characteristics of an IgM-bearing memory B cell. WM and IgM myeloma follow a similar clinical course, but therapeutic options are different.

798 Clinical course of Waldenström's macroglobulinemia is similar to ?

Harrison's 18th Ed. 943

- A. IgA myeloma
- B. IgG myeloma
- C. IgD myeloma
- D. IgM myeloma

Waldenström's macroglobulinemia and IgM myeloma follow a similar clinical course, but therapeutic options are different.

799 IgM in Waldenström's Macroglobulinemia have specificity for which protein ?

Harrison's 18th Ed. 943

- A. Myelin basic protein (MBP)
- B. Myelin-associated glycoprotein (MAG)
- C. Myelin oligodendrocyte glycoprotein (MOG)
- D. All of the above

IgM in Waldenström's Macroglobulinemia have specificity for Myelin-associated glycoprotein (MAG) protein. WM patients develop peripheral neuropathy, and half of these patients are positive for anti-MAG antibody. Neuropathy may precede appearance of the neoplasm.

800 Which of the following statements about Waldenström's macroglobulinemia is false ?

Harrison's 18th Ed. 943

- A. Renal disease is uncommon
- B. Lytic bone lesions are frequent
- C. Does not cause hypercalcemia
- D. Impairment of vision is a major symptom

Unlike myeloma, WM does not cause bone lesions or hypercalcemia. Renal disease is not common and 80% excrete kappa isotype light chain.

801 Neurologic abnormalities that may be associated with Waldenström's macroglobulinemia include all except ?

N Engl J Med 2001;345:682

- A. Peripheral neuropathy
- B. Encephalopathy
- C. Ataxia
- D. Subarachnoid hemorrhage

802 Which of the following drugs is useful in Waldenström's macroglobulinemia ?

Harrison's 18th Ed. 943

- A. Fludarabine
- B. Cladribine
- C. Rituximab (anti-CD20)
- D. All of the above

Fludarabine (25 mg/m² per day for 5 days every 4 weeks) or cladribine (0.1 mg/kg per day for 7 days every 4 weeks) are highly effective single agents. Rituximab (anti-CD20), bortezomib, bendamustine and lenalidomide have improved patient outcome.

803 Which of the following is not a feature of POEMS syndrome ?

Harrison's 18th Ed. 943

- A. Polyneuropathy
- B. Orthostatic hypotension
- C. Endocrinopathy
- D. Multiple myeloma

804 Which of the following is not a feature of POEMS syndrome ?

Harrison's 18th Ed. 943

- A. Polyneuropathy
- B. Organomegaly
- C. Multiple sclerosis
- D. Skin changes

The features of POEMS syndrome are polyneuropathy (severe, progressive sensorimotor), organomegaly, endocrinopathy, multiple myeloma, and skin changes (POEMS).

805 Endocrine manifestations seen in POEMS syndrome include ?

Harrison's 18th Ed. 943

- A. Amenorrhea
- B. Gynecomastia
- C. Type 2 diabetes mellitus
- D. All of the above

Endocrine manifestations of POEMS syndrome include amenorrhea, gynecomastia, hyperprolactinemia, Type 2 diabetes mellitus, hypothyroidism and adrenal insufficiency.

806 Skin changes seen in POEMS syndrome include ?

Harrison's 18th Ed. 943

- A. Hyperpigmentation
- B. Hypertrichosis
- C. Digital clubbing
- D. All of the above

Skin changes in POEMS syndrome are hyperpigmentation, hypertrichosis, skin thickening & digital clubbing.

807 Levels of which of the following is low in POEMS syndrome ?

Harrison's 18th Ed. 943

- A. IL-1
- B. TGF- β

- C. VEGF
- D. TNF

In POEMS syndrome, high circulating levels of the proinflammatory cytokines IL-1, IL-6, VEGF, and TNF is documented, and levels of the inhibitory cytokine TGF- β are lower than expected.

808 Plasmapheresis is not beneficial in which of the following ?

Harrison's 18th Ed. 943

- A. POEMS syndrome
- B. Multiple Myeloma
- C. TTP/HUS
- D. Waldenström's Macroglobulinemia

Plasmapheresis does not appear to be of benefit in POEMS syndrome

809 Franklin's disease is also called ?

Harrison's 18th Ed. 943

- A. Alpha heavy chain disease
- B. Gamma heavy chain disease
- C. Mu heavy chain disease
- D. None of the above

Gamma heavy chain disease is also called Franklin's disease.

810 Seligmann's disease is also called ?

Harrison's 18th Ed. 944

- A. Alpha heavy chain disease
- B. Gamma heavy chain disease
- C. Mu heavy chain disease
- D. None of the above

Alpha heavy chain disease is also called Seligmann's disease. It is the most common of the heavy chain diseases.

811 Palatal edema is the distinctive symptom of ?

Harrison's 18th Ed. 943

- A. Alpha heavy chain disease
- B. Gamma heavy chain disease
- C. Mu heavy chain disease
- D. None of the above

Most distinctive symptom of Gamma Heavy Chain Disease (Franklin's Disease) is palatal edema due to involvement of nodes in Waldeyer's ring. It may produce respiratory compromise.

812 Which of the following diseases is related to Mediterranean lymphoma ?

Harrison's 18th Ed. 944

- A. Alpha heavy chain disease
- B. Gamma heavy chain disease
- C. Mu heavy chain disease
- D. None of the above

813 Sandhoff disease is nearly identical to which of the following diseases ?

Harrison's 17th Ed. 2453

- A. Gaucher disease
- B. Tay-Sachs disease
- C. Neimann-Pick disease
- D. Fabry disease

Autosomal recessive Sandhoff disease is phenotypically similar to Tay-Sachs disease, but hepatosplenomegaly & bony dysplasias are also present. Macrocephaly & hyperacusis are present.

814 Enlarged, grayish yellow or orange tonsils are pathognomonic of ?

Harrison's 17th Ed. 2423

- A. Waldenström's macroglobulinemia
- B. Polycythemia vera
- C. Wolman disease
- D. Tangier disease

Tangier disease is associated with cholesterol accumulation in reticuloendothelial system with hepatosplenomegaly & enlarged, grayish yellow or orange tonsils.

815 Which of the following statements about Schnitzler's syndrome is false ?

N Engl J Med 2001;345:682

- A. Associated with IgM monoclonal protein
- B. Erythematous, urticarial skin lesions
- C. Dermis is infiltrated by malignant lymphocytic and plasmacytic cells
- D. None of the above

816 Clinical features of Schnitzler's syndrome all except ?

N Engl J Med 2001;345:682

- A. Bone pain
- B. Urticarial skin lesions
- C. Lymphadenopathy
- D. Alopecia

817 Schnitzler's syndrome includes all except ?

N Engl J Med 2001;345:682

- A. IgM monoclonal protein
- B. Infiltration of dermis by malignant lymphocytic & plasmacytic cells
- C. Erythematous urticarial skin lesions
- D. Serum IgM M component >1000 mg/dL

Schnitzler's syndrome is the association of an IgM monoclonal protein with erythematous, urticarial skin lesions. Infiltration of the dermis by malignant lymphocytic and plasmacytic cells can cause nodular and macular lesions similar to those seen in leukemia and lymphoma; an IgM monoclonal protein may be deposited in the skin and cause pruritic papules. Schnitzler's syndrome, which is characterized by urticarial skin lesions that are often nonpruritic as well as by recurrent fever, bone pain, and lymphadenopathy in conjunction with a value for the serum IgM M component that is usually less than 1000 mg/dL.

Chapter 113. Transfusion Biology and Therapy

818 Production of antibodies directed against blood group antigens of another individual are called ?

Harrison's 18th Ed. 951

- A. Alloantibodies
- B. Heteroantibodies
- C. Autoantibodies
- D. Oligoantibodies

RBC's and other cellular blood elements & plasma proteins are antigenic and can result in alloimmunization i.e. production of antibodies directed against blood group antigens of another individual. These antibodies are called alloantibodies.

819 Antibodies resulting from "natural" exposure are ?

Harrison's 18th Ed. 951

- A. IgG
- B. IgM
- C. IgA
- D. IgE

Antibodies directed against RBC antigens resulting from "natural" exposure are of IgM isotype.

820 Antibodies that result from allogeneic exposure like transfusion or pregnancy are usually ?

Harrison's 18th Ed. 951

- A. IgG
- B. IgM
- C. IgA
- D. IgE

Blood transfusion or pregnancy (allogeneic exposure) result in IgG antibody formation. IgG antibodies can cross placenta resulting in hemolytic disease of the newborn, or hydrops fetalis.

821 A and B antigens are ?

Harrison's 18th Ed. 951

- A. Carbohydrates
- B. Proteins
- C. Lipids
- D. None of the above

A or B antigens are carbohydrates attached to a precursor backbone. They are found on cellular membrane either as glycosphingolipids or glycoproteins, and are secreted into plasma and body fluids as glycoproteins.

822 Immediate precursor upon which A & B antigen are added is ?

Harrison's 18th Ed. 951

- A. H substance
- B. P substance
- C. Z substance
- D. K substance

H substance is the immediate precursor on which the A and B antigens are added.

823 In the formation of H substance, the essential substance is ?

Harrison's 18th Ed. 951

- A. Fucose
- B. Galactose
- C. Fructose
- D. Mannose

H substance is formed by the addition of fucose to the glycolipid or glycoprotein backbone.

824 Addition of N-acetylgalactosamine to H substance creates ?

Harrison's 18th Ed. 951

- A. A antigen
- B. B antigen
- C. Rh antigen
- D. None of the above

825 Addition of galactose to H substance creates ?

Harrison's 18th Ed. 951

- A. A antigen
- B. B antigen
- C. Rh antigen

- D. None of the above

Addition of N-acetylgalactosamine creates A antigen, while addition of galactose produces B antigen.

826 Genes that determine A & B phenotypes are found on chromosome ?

Harrison's 18th Ed. 951

- A. 6 p
- B. 7 p
- C. 8 p
- D. 9 p

827 Genes that determine the A and B phenotypes are expressed in ?

Harrison's 18th Ed. 951

- A. Mendelian dominant manner
- B. Mendelian recessive manner
- C. Mendelian codominant manner
- D. None of the above

The genes that determine the A and B phenotypes are found on chromosome 9p and are expressed in a Mendelian codominant manner.

828 Which of the following "transferases" contributes to the formation of A or B blood groups ?

Harrison's 18th Ed. 951

- A. N-acetyl transferase (NAT)
- B. Glutathione-S-transferase
- C. Histone acetyl transferase (HAT)
- D. Glycosyl transferases

Glycosyl transferases are gene products which confer enzymatic capability of attaching specific antigenic carbohydrate. Individuals who lack "A" and "B" transferases are phenotypically type "O" while those who inherit both transferases are type "AB".

829 Naturally occurring anti-A and anti-B antibodies are termed ?

Harrison's 18th Ed. 951

- A. Isoagglutinins
- B. Homoagglutinins
- C. Naturoagglutinins
- D. AB agglutinins

Naturally occurring anti-A & anti-B antibodies are termed isoagglutinins.

830 Isoagglutinin found in type AB individuals is ?

Harrison's 18th Ed. 951

- A. Anti-A
- B. Anti-B
- C. Anti-A + Anti-B
- D. None of the above

831 Isoagglutinin found in type O individuals is ?

Harrison's 18th Ed. 951

- A. Anti-A
- B. Anti-B
- C. Anti-A + Anti-B
- D. None of the above

Type A individuals produce anti-B, while type B individuals make anti-A isoagglutinins. Neither isoagglutinin is found in type AB individuals. Type O individuals produce both anti-A & anti-B.

832 Individuals with Bombay phenotype produce antibodies to ?*Harrison's 18th Ed. 951*

- A. H substance
- B. A antigens
- C. B antigens
- D. All of the above

Individuals with Bombay phenotype produce antibodies to H substance as well as to both A & B antigens and are therefore compatible only with other hh donors.

833 Nonsecretors of A & B antigens by cells in the circulation are susceptible to ?*Harrison's 18th Ed. 951*

- A. Hemolysis
- B. Malignancy
- C. Infections
- D. All of the above

A & B antigens are secreted by cells in the circulation. Nonsecretors are susceptible to infections (*C. albicans*, *N. meningitidis*, *S. pneumoniae*, *H. influenzae*) as they may bind to polysaccharides on cells. Soluble blood group antigens block this binding.

834 Gene determining Rh phenotypes is found on chromosome ?*Harrison's 18th Ed. 951*

- A. 1
- B. 2
- C. 3
- D. 4

835 Which of the following is Rh antigen ?*Harrison's 18th Ed. 951*

- A. C
- B. D
- C. E
- D. All of the above

The three Rh genes, *E/e*, *D*, and *C/c*, are arranged in tandem on chromosome 1 and inherited as a haplotype, i.e., *cDE* or *Cde*.

836 What percentage of people lack the D antigen ?*Harrison's 18th Ed. 951*

- A. About 15 %
- B. About 20 %
- C. About 25 %
- D. About 30 %

~15% of individuals lack D alloantigen.

837 Which of the following is not a RBC blood group system ?*Harrison's 18th Ed. 952 Table 113-1*

- A. Lewis
- B. Smith
- C. Kell
- D. Duffy

RBC blood group systems are Rh (*D*, *C/c*, *E/e*), Lewis (*Le^a*, *Le^b*), Kell (*K/k*), Duffy (*Fy^a*/*Fy^b*), Kidd (*Jk^a*/*Jk^b*), *I/i* and MNSsU.

838 The Lewis gene is located on ?*Harrison's 18th Ed. 951*

- A. Chromosome 10

- B. Chromosome 12
- C. Chromosome 15
- D. Chromosome 19

Lewis gene product is a fucosyl transferase and maps to chromosome 19.

839 Which of the following statements about antibodies to Lewis antigens is false ?*Harrison's 18th Ed. 951*

- A. Usually IgM type
- B. Can cross placenta
- C. Cause incompatibility during pretransfusion screening
- D. None of the above

Lewis antigens cannot cross placenta.

840 Paroxysmal Cold Hemoglobinuria (PCH) is related to ?*Harrison's 18th Ed. 952*

- A. Lewis system
- B. P system
- C. MNSsU system
- D. I system

In PCH, autoantibody with biphasic properties (Donath-Landsteiner antibodies) to P is produced that binds to RBCs in cold & fixes complement upon warming.

841 Which of the following antigen is the cellular receptor for Plasmodium vivax ?*Harrison's 18th Ed. 952*

- A. Lewis antigen
- B. Kidd antigen
- C. P antigen
- D. Duffy antigen

Duffy antigens serve as receptors for Plasmodium vivax. >70% of persons in malaria-endemic areas lack these antigens.

842 In Plasmodium falciparum infection, which of the following microbial ligand interacts with host receptor Glycophorin A ?*Harrison's 18th Ed. 1014 Table 120-1*

- A. Erythrocyte-binding protein 165 (EBA-165)
- B. Erythrocyte-binding protein 175 (EBA-175)
- C. Erythrocyte-binding protein 185 (EBA-185)
- D. Erythrocyte-binding protein 195 (EBA-195)

843 Which of the following antigen is the cellular receptor of parvovirus B19 ?*Harrison's 18th Ed. 952*

- A. Lewis antigen
- B. Kidd antigen
- C. P antigen
- D. Duffy antigen

The P antigen is the cellular receptor of parvovirus B19.

844 Which of the following gene is present on the X chromosome ?*Harrison's 18th Ed. 952*

- A. AB
- B. Rh

- C. Kell
- D. Lewis

Kell precursor protein is controlled by a gene on X.

845 Virtually every donor is incompatible because nearly all persons express ?

Harrison's 18th Ed. 952

- A. M
- B. N
- C. S
- D. U

Anti-U antibodies are rare but problematic. Virtually every donor is incompatible because nearly all persons express U.

846 After ABO and Rh systems, which of the following RBC blood group system is most immunogenic ?

Harrison's 18th Ed. 952

- A. Lewis
- B. MNSsU
- C. Kell
- D. Duffy

The immunogenicity of Kell is third behind the ABO and Rh systems.

847 McLeod syndrome is related to which of the following blood group antigens ?

Harrison's 18th Ed. 952

- A. Lewis
- B. Kidd
- C. Kell
- D. Duffy

McLeod syndrome is due to absence of Kell precursor protein that leads to acanthocytosis, shortened RBC survival & progressive form of muscular dystrophy that includes cardiac defects.

848 Collection of multiple units of platelets from a single donor is called ?

Harrison's 18th Ed. 952

- A. Thrombopheresis technology
- B. Hyperpheresis technology
- C. Neopheresis technology
- D. Apheresis technology

Collection of multiple units of platelets from a single donor is done by Apheresis technology.

849 Which of the following is not a processed component of whole blood ?

Harrison's 18th Ed. 952

- A. Packed RBC (PRBC)
- B. Platelets
- C. Heat precipitate
- D. Cryoprecipitate

Blood products intended for transfusion are routinely collected as whole blood (450 mL) in various anticoagulants. Most donated blood is processed into following components - PRBCs, platelets, and fresh-frozen plasma (FFP) or cryoprecipitate. By slow centrifugation, whole blood is first separated into PRBCs & platelet-rich plasma (PRP). Platelet-rich plasma is then centrifuged at high speed to yield one unit of random donor (RD) platelets & one unit of FFP. Cryoprecipitate is produced by thawing FFP to precipitate the plasma proteins, then separated by centrifugation.

850 Single-donor apheresis platelets (SDAP) is equivalent to how many units of random donor (RD) platelets ?

Harrison's 18th Ed. 952

- A. 2
- B. 4
- C. 6
- D. 8

Single-donor apheresis platelets (SDAP) contain platelets equivalent to ~6 units of random donor (RD) platelets.

851 Threshold for prophylactic platelet transfusion In patients without fever or infections is ?

Harrison's 18th Ed. 953

- A. 5,000 / μ L
- B. 10,000 / μ L
- C. 25,000 / μ L
- D. 50,000 / μ L

Threshold for prophylactic platelet transfusion in patients without fever or infections is 10000/ μ L, 5,000/ μ L for those with fever or infections & 50000/ μ L for those undergoing invasive procedures.

852 Refractoriness to rise in post-transfusion platelet counts is investigated by ?

Harrison's 18th Ed. 953

- A. Anti-HLA antibodies in recipient's serum
- B. Anti-Jk antibodies in recipient's serum
- C. Anti-U antibodies in recipient's serum
- D. Anti-I autoantibodies in recipient's serum

Refractoriness to rise in post transfusion platelet counts is investigated by detecting anti-HLA antibodies in the recipient's serum.

853 Fresh-Frozen Plasma (FFP) contains all except ?

Harrison's 18th Ed. 953

- A. Fibrinogen
- B. Prothrombin
- C. Antithrombin
- D. Proteins C and S

FFP contains stable coagulation factors and plasma proteins like fibrinogen, antithrombin, albumin, and proteins C and S.

854 Cryoprecipitate is a source of ?

Harrison's 18th Ed. 953

- A. Fibrinogen
- B. Factor VIII
- C. von Willebrand factor (vWF)
- D. All of the above

Cryoprecipitate is a source of fibrinogen, factor VIII & von Willebrand factor (vWF).

855 Each unit of cryoprecipitate contains how much of factor VIII ?

Harrison's 18th Ed. 954

- A. ~ 20 units
- B. ~ 80 units
- C. ~ 200 units
- D. ~ 800 units

Each unit of cryoprecipitate contains ~80 units of factor VIII.

856 Infectious agents rarely associated with transfusion include ?*Harrison's 18th Ed. 954 Table 113-3*

- A. West Nile virus
- B. Hepatitis A virus
- C. Treponema pallidum
- D. All of the above

Infectious agents rarely associated with transfusion include West Nile virus, hepatitis A virus, parvovirus B-19, Babesia microti (babesiosis), Borrelia burgdorferi (Lyme disease), Anaplasma phagocytophilum (human granulocytic ehrlichiosis), Trypanosoma cruzi (Chagas disease), Treponema pallidum, and human herpesvirus-8.

857 Laboratory evaluation for posttransfusion hemolysis includes ?*Harrison's 18th Ed. 954*

- A. Haptoglobin
- B. Lactate dehydrogenase (LDH)
- C. Indirect bilirubin
- D. All of the above

Laboratory evaluation for posttransfusion hemolysis includes the measurement of serum haptoglobin, lactate dehydrogenase (LDH), and indirect bilirubin levels.

858 Most frequent reaction associated with transfusion of cellular blood components is ?*Harrison's 18th Ed. 955*

- A. Febrile Nonhemolytic Transfusion Reaction (FNHTR)
- B. Allergic Reactions
- C. Anaphylactic Reaction
- D. Graft-versus-host disease (GVHD)

Most frequent reaction associated with transfusion of cellular blood components is a febrile nonhemolytic transfusion reaction (FNHTR). Antibodies directed against donor leukocyte & HLA antigens & cytokines released from cells within stored blood components mediate these reactions.

859 Urticarial reactions are related to which of the following components of transfused blood ?*Harrison's 18th Ed. 955*

- A. RBC
- B. Platelets
- C. Plasma proteins
- D. Leucocytes

Urticarial reactions are related to plasma proteins found in transfused components.

860 Patients with which of the following are at risk for anaphylactic reactions associated with plasma transfusion ?*Harrison's 18th Ed. 955*

- A. IgA deficiency
- B. IgG deficiency
- C. IgE deficiency
- D. IgM deficiency

Patients who are IgA-deficient are at risk for anaphylactic reactions associated with plasma transfusion and should therefore receive only IgA-deficient plasma and washed cellular blood components.

861 Alloantibodies directed against which of the following RBC antigens does result in hemolysis ?*Harrison's 18th Ed. 952 Table 113-1*

- A. Rh
- B. Kell

- C. I
- D. Duffy

I and i are not allelic pairs but are carbohydrate antigens. Alloantibodies directed against other RBC antigens like Rh, Kell, and Duffy may result in hemolysis.

862 Which of the following can occur after blood / blood product transfusion ?*Harrison's 18th Ed. 955*

- A. Graft-versus-host disease (GVHD)
- B. Hypothermia
- C. Thrombocytopenia
- D. All of the above

Predominantly in women, thrombocytopenia may occur 7 - 10 days after platelet transfusion. Platelet-specific antibodies are found in recipient's serum, and most frequently recognized antigen is HPA-1a found on the platelet glycoprotein IIIa receptor. Antibodies react to both donor & recipient platelets, hence the delay. Treatment with IVIg neutralizes the effector antibodies. Plasmapheresis can be used to remove the antibodies.

863 Transfusion-associated GVHD (TA-GVHD) is characterized by ?*Harrison's 18th Ed. 955*

- A. Marrow aplasia & pancytopenia
- B. Resistance to immunosuppressive therapies
- C. Clinical manifestations appear at 8 - 10 days
- D. All of the above

TA-GVHD is characterized by marrow aplasia & pancytopenia. It is highly resistant to treatment with immunosuppressive therapies like glucocorticoids, cyclosporine, antithymocyte globulin & ablative therapy followed by allogeneic bone marrow transplantation. Clinical manifestations appear at 8 - 10 days and death occurs at 3 - 4 weeks posttransfusion.

864 Transfusion-related acute lung injury (TRALI) occurs within how many hours after blood transfusion ?*Harrison's 18th Ed. 955, N Engl J Med 1999;340:442*

- A. 6 hours
- B. 12 hours
- C. 24 hours
- D. 48 hours

TRALI, an acute respiratory distress syndrome, occurs within 6 hours after blood transfusion & is characterized by dyspnea & hypoxia due to noncardiogenic pulmonary edema.

865 Cause of TRALI usually is ?*Harrison's 18th Ed. 955*

- A. High-titer anti-HLA antibodies in recipient plasma
- B. Low-titer anti-HLA antibodies in donor plasma
- C. High-titer anti-HLA antibodies in donor plasma
- D. HPA-1a on the platelet glycoprotein IIIa receptor

TRALI usually results from the transfusion of donor plasma that contains high-titer anti-HLA antibodies that bind recipient leukocytes which aggregate in pulmonary vasculature & release mediators that increase capillary permeability.

866 Iron content in each unit of RBCs transfusion is ?*Harrison's 18th Ed. 956*

- A. 100 to 125 mg of iron
- B. 125 to 150 mg of iron
- C. 150 to 200 mg of iron
- D. 200 to 250 mg of iron

Each unit of RBCs contains 200 - 250 mg of iron.

867 Symptoms and signs of iron overload are common after how many units of RBCs transfusion ?

Harrison's 18th Ed. 956

- A. 10
- B. 20
- C. 50
- D. 100

Symptoms and signs of iron overload (endocrine, hepatic, cardiac) are common after 100 units of RBC transfusion (total-body iron load of 20 grams).

868 Transient hypotension during blood transfusion is more common in those taking ?

Harrison's 18th Ed. 956

- A. Angiotensin-converting enzyme (ACE) inhibitors
- B. Beta blockers
- C. Calcium channel blockers
- D. All of the above

Transient hypotension is noted in transfused patients taking ACE inhibitors due to increased bradykinin levels. Blood products contain bradykinin that is normally degraded by ACE.

869 Nucleic acid amplification testing (NAT) is used to prevent which of the following complications of transfusion ?

Harrison's 18th Ed. 956

- A. Transfusion-associated GVHD
- B. Infectious complications
- C. Transfusion-related acute lung injury (TRALI)
- D. All of the above

870 Which of the following carries the least risk of transmission through blood transfusion ?

Harrison's 18th Ed. 956

- A. Hepatitis B
- B. Hepatitis C
- C. HIV-1
- D. HIV-2

No cases of HIV-2 infection have been reported in the United States since 1992. Other infectious agents rarely associated with transfusion include - Hepatitis A virus, parvovirus B-19, Babesia microti (babesiosis), Borrelia burgdorferi (Lyme disease), Trypanosoma cruzi (Chagas disease), and Treponema pallidum, human herpesvirus-8 and hepatitis G virus.

871 To detect HIV-1 infection, donor blood is tested for ?

Harrison's 18th Ed. 956

- A. p24 antigen
- B. Glycoprotein 120
- C. Glycoprotein 41
- D. All of the above

Donated blood is tested for antibodies to HIV-1, HIV-1 p24 antigen, and HIV RNA using Nucleic acid amplification testing (NAT). Risk of HIV-1 infection per transfusion episode is 1 in 2 million.

872 Bacteria most commonly implicated in contamination of red cells during blood transfusion is ?

Harrison's 18th Ed. 956, N Engl J Med 1999;340:442

- A. Staphylococcus aureus
- B. Klebsiella pneumoniae
- C. Yersinia enterocolitica
- D. Staphylococcus epidermidis

Organism most commonly causing bacterial contamination of RBCs is Yersinia enterocolitica. Yersinia, Pseudomonas, Serratia, Acinetobacter, and Escherichia species have all been implicated in infections related to PRBC transfusion.

873 Parasitic diseases that can be transmitted by blood transfusion include ?

Harrison's 18th Ed. 956

- A. Malaria
- B. Babesiosis
- C. Chagas' disease
- D. All of the above

Parasitic diseases that can be transmitted by blood transfusion include malaria, babesiosis, Chagas disease. Dengue, chikungunya virus, variant Creutzfeldt-Jakob disease, Anaplasma phagocytophilum, and yellow fever vaccine virus can also be transmitted by blood transfusion.

874 Perfluorocarbons are best known as ?

Harrison's 16th Ed. 667

- A. Oxygen-carrying blood substitutes
- B. Protein substitutes
- C. Fat substitutes
- D. Iron chelators

Oxygen-carrying blood substitutes, such as perfluorocarbons and aggregated hemoglobin solution, are presently in various stages of clinical trials.

875 Specialized tissues that sense local oxygen tension include ?

N Engl J Med 2005;353:2042-55

- A. Glomus cells of the carotid body
- B. Neuroepithelial bodies in the lungs
- C. Chromaffin cells of the fetal adrenal medulla
- D. All of the above

876 Specialized tissues that sense local oxygen tension include ?

N Engl J Med 2005;353:2042-55

- A. Smooth-muscle cells of the resistance pulmonary arteries
- B. Fetoplacental arteries
- C. Ductus arteriosus
- D. All of the above

877 What are Howell-Jolly bodies ?

N Engl J Med 2005;353:498-507

- A. Nuclear fragments
- B. Hemosiderin-containing granules
- C. Altered ribosomes
- D. All of the above

878 What are Pappenheimer bodies ?

N Engl J Med 2005;353:498-507

- A. Nuclear fragments
- B. Hemosiderin-containing granules
- C. Altered ribosomes
- D. All of the above

879 What is basophilic stippling or punctate basophilia ?

N Engl J Med 2005;353:498-507

- A. Nuclear fragments
- B. Hemosiderin-containing granules
- C. Altered ribosomes
- D. All of the above

880 Microspherocytes can be found in ?*N Engl J Med 2005;353:498-507*

- A. Spherocytic hemolytic anemia
- B. Microangiopathic hemolytic anemia
- C. Burns
- D. All of the above

Chapter 115.**Disorders of Platelets and Vessel Wall****881 Major regulator of platelet production - thrombopoietin (TPO) is synthesized in ?***Harrison's 18th Ed. 965*

- A. Kidney
- B. Liver
- C. Muscle
- D. Adipose tissue

*Thrombopoietin (TPO) is a hormone synthesized in liver that regulates platelet production.***882 Synthesis of thrombopoietin is increased specifically by ?***Harrison's 18th Ed. 965*

- A. Interleukin 6
- B. Prostaglandin D2
- C. TNF alpha
- D. Interferon beta

*Synthesis is increased with inflammation and specifically by interleukin 6.***883 Average life span of platelets in circulation is ?***Harrison's 18th Ed. 965*

- A. 1 - 3 days
- B. 3 - 7 days
- C. 7 - 10 days
- D. 11 - 18 days

*Average life span of platelets in circulation is 7-10 days. Platelets were identified in 1865 and their function was elucidated by Giulio Bizzozero in 1882.***884 What proportion of platelets reside in the spleen ?***Harrison's 18th Ed. 965*

- A. One - third
- B. Half
- C. Two - third
- D. Three - fourth

*Approximately one-third of the platelets reside in the spleen***885 Which of the following statements is false ?***Harrison's 18th Ed. 965*

- A. TPO binds to its receptor on platelets
- B. TPO binds to its receptor on megakaryocytes
- C. Platelets are anucleate
- D. None of the above

*TPO binds to its receptor on platelets and megakaryocytes and is thus removed from the circulation. Therefore, a reduction in platelet and megakaryocyte mass increases the level of TPO, which then stimulates platelet production.***886 Which of the following statements is false ?***Harrison's 18th Ed. 965*

- A. Nitric oxide is a platelet inhibitor
- B. Endothelin is a platelet activator
- C. Platelets adhere to exposed intimal surface through VWF
- D. None of the above

*Endothelium-derived vasodilator nitric oxide is a platelet inhibitor. Endothelium-derived vasoconstrictor endothelin is a platelet activator.***887 Pseudothrombocytopenia is due to ?***Harrison's 18th Ed. 965*

- A. Exercise
- B. Laboratory artifact
- C. Cold weather
- D. Fasting

*Pseudothrombocytopenia is an in vitro artifact resulting by blood collection.***888 Pseudothrombocytopenia is most likely when blood is collected with which of the following anticoagulants ?***Harrison's 18th Ed. 965*

- A. EDTA
- B. Sodium citrate
- C. Heparin
- D. All of the above

*Pseudothrombocytopenia is an in vitro artifact resulting from platelet agglutination via antibodies when the calcium content is decreased by blood collection in ethylenediamine tetraacetic (EDTA) anticoagulated blood tubes.***889 Which of the following is the most common cause of thrombocytopenia ?***Harrison's 18th Ed. 966*

- A. Inherited disorders
- B. Myelodysplasia
- C. Drugs
- D. Pseudothrombocytopenia

*Drugs are the most common cause of thrombocytopenia.***890 What is the platelet count required to maintain vascular integrity in the microcirculation ?***Harrison's 18th Ed. 966*

- A. 5000 - 10,000 / μ L
- B. 15000 - 20,000 / μ L
- C. 25000 - 40,000 / μ L
- D. 50000 - 100,000 / μ L

*A platelet count of ~5000 - 10,000 is required to maintain vascular integrity in microcirculation.***891 Which of the following statements about petechiae is false ?***Harrison's 18th Ed. 966*

- A. Nonblanching hemorrhages
- B. First appear in areas of increased venous pressure
- C. Pinpoint
- D. Sign of a platelet dysfunction

Petechiae first appear in areas of increased venous pressure and are pinpoint, nonblanching hemorrhages and are usually a sign of a decreased platelet number and not platelet dysfunction. Excessive bruising is seen in disorders of both platelet number and function.

892 In wet purpura, blood blisters form on ?

Harrison's 18th Ed. 966

- A. Sole
- B. Palm
- C. Oral mucosa
- D. Scalp

Wet purpura, blood blisters that form on the oral mucosa denote an increased risk of life-threatening hemorrhage in the thrombocytopenic patient.

893 Immune-mediated thrombocytopenia (ITP2) in children usually follows which of the following ?

Harrison's 18th Ed. 967

- A. Bacterial infection
- B. Viral infection
- C. Drug ingestion
- D. Any of the above

Immune-mediated thrombocytopenia (ITP2) in children usually follows a viral infection and almost always resolves spontaneously.

894 Which out of the following drugs is most capable of inducing drug-dependent antibodies ?

Harrison's 18th Ed. 967

- A. Amiodarone
- B. Cephalosporin
- C. Digoxin
- D. Quinine

Classic drug-dependent antibodies are antibodies that react with specific platelet surface antigens and result in thrombocytopenia only when the drug is present. They are more common with quinine, quinidine, rifampicin, and trimethoprim-sulphamethoxazole.

895 Drug induced thrombocytopenia usually resolves how many days after drug withdrawal ?

Harrison's 18th Ed. 967

- A. 1 - 3 days
- B. 3 - 7 days
- C. 7 - 10 days
- D. 14 - 21 days

Drug induced thrombocytopenia typically occurs after a period of initial exposure (median length 21 days), or upon reexposure, and usually resolves in 7-10 days after drug withdrawal.

896 Which of the following is false about Heparin-Induced Thrombocytopenia (HIT) ?

Harrison's 18th Ed. 967

- A. HIT is not usually severe
- B. HIT is not associated with bleeding
- C. HIT markedly increases risk of thrombosis
- D. None of the above

897 In Heparin-Induced Thrombocytopenia (HIT), antibody formation is against which of the following ?

Harrison's 18th Ed. 967

- A. Platelet factor 4 (PF4)
- B. Heparin
- C. Platelet factor 4 (PF4) and heparin complex
- D. Endothelial cells

HIT results from antibody (IgG isotype) formation against heparin-PF4 complex & to platelet Fc receptors.

898 As compared to LMWH, HIT is how many times more common with the use of UFH ?

Harrison's 18th Ed. 967

- A. Twice
- B. Thrice
- C. 5 times
- D. 10 times

HIT is about 10 times more common with the use of unfractionated heparin (UFH) than after exposure to low-molecular-weight heparin (LMWH).

899 Most patients develop HIT after exposure to heparin for how many days ?

Harrison's 18th Ed. 967

- A. 1 - 3 days
- B. 3 - 5 days
- C. 5 - 14 days
- D. 14 - 21 days

Most patients develop HIT after exposure to heparin for 5 - 14 days.

900 Which of the following statements about HIT is false ?

Harrison's 18th Ed. 967, 995

- A. Occurs earlier if heparin given within past 3 months
- B. More common in medical than in surgical patients
- C. HIT is more frequent in females than in males
- D. Platelet count rarely fall to <20000/ μ L

HIT is more common in surgical patients than in medical patients

901 Which of the following about HIT is false ?

Harrison's 18th Ed. 967, 995

- A. Most specific diagnostic test is serotonin release assay
- B. Venous thrombosis more common than arterial thrombosis
- C. Platelet transfusions are not advised
- D. None of the above

902 Which of the following drugs is effective in the treatment of Heparin induced thrombocytopenia and thrombosis (HITT) ?

Harrison's 18th Ed. 968

- A. Argatroban
- B. Lepirudin
- C. Danaparoid
- D. All of the above

Early recognition, prompt discontinuation of heparin and use of alternative anticoagulants is key in treatment of HIT. Argatroban, Lepirudin, Danaparoid, Bivalirudin & Fondaparinux are effective in HITT.

903 Secondary immune thrombocytopenic purpura is associated with which of the following diseases ?

Harrison's 18th Ed. 968

- A. Systemic lupus erythematosus (SLE)
- B. HIV
- C. Hepatitis C
- D. All of the above

Immune / idiopathic thrombocytopenic purpura ITP is termed secondary if it is associated with an underlying disorder like systemic lupus erythematosus (SLE), HIV and hepatitis C

904 Evans's syndrome refers to ?*Harrison's 18th Ed. 968*

- A. Autoimmune hemolytic anemia with ITP
- B. SLE with ITP
- C. HIV with ITP
- D. Hepatitis C with ITP

*Autoimmune hemolytic anemia with ITP is termed as Evans's syndrome.***905 Thrombocytopenia related mortality increases with platelet counts less than ?***Harrison's 18th Ed. 968*

- A. 30,000 / μ L
- B. 50,000 / μ L
- C. 75,000 / μ L
- D. 100,000 / μ L

*Patients with platelet counts >30,000/ μ L appear not to have increased mortality related to the thrombocytopenia.***906 All IVIgG immunoglobulin preparations are derived from ?***Harrison's 18th Ed. 969*

- A. Human plasma
- B. Horse plasma
- C. Bovine plasma
- D. Pig plasma

*All IVIgG immunoglobulin preparations are derived from human plasma.***907 In ITP, total dose of IVIgG is ?***Harrison's 18th Ed. 969*

- A. 1 gram / kg
- B. 2 gram / kg
- C. 3 gram / kg
- D. 4 gram / kg

*In ITP, total dose of IVIgG is 2 gram / kg.***908 Which of the following drugs is useful in refractory ITP ?***Harrison's 18th Ed. 969*

- A. Rituximab
- B. Romiplostim
- C. Eltrombopag
- D. All of the above

*Rituximab, an anti-CD20 (B cell) antibody, has shown efficacy in the treatment of refractory ITP. Two thrombopoietin receptor agonists - one administered subcutaneously (romiplostim) and another orally (eltrombopag), have shown response in many patients with refractory ITP.***909 Large platelets is a feature of which of the following ?***Harrison's 18th Ed. 969*

- A. May-Hegglin anomaly
- B. Sebastian syndrome
- C. Epstein's syndrome
- D. All of the above

*May-Hegglin anomaly, and Sebastian, Epstein's, and Fechtner syndromes have thrombocytopenia with large platelets & are inherited as autosomal dominant & are associated with mutations in nonmuscle myosin heavy chain MYH9 gene.***910 Autosomal recessive inherited thrombocytopenic disorders include ?***Harrison's 18th Ed. 969*

- A. Congenital amegakaryocytic thrombocytopenia
- B. Thrombocytopenia with absent radii
- C. Bernard Soulier syndrome
- D. All of the above

*Autosomal recessive inherited thrombocytopenic disorders include congenital amegakaryocytic thrombocytopenia, thrombocytopenia with absent radii and Bernard Soulier syndrome.***911 Which of the following is inherited as X-linked pattern in inherited thrombocytopenia ?***Harrison's 18th Ed. 969*

- A. May-Hegglin anomaly
- B. Wiskott-Aldrich syndrome
- C. Fechtner syndrome
- D. Bernard Soulier syndrome

*X-linked inherited thrombocytopenic disorders include Wiskott-Aldrich syndrome.***912 Which of the following is false regarding thrombotic thrombocytopenic microangiopathies ?***Harrison's 18th Ed. 969*

- A. Thrombocytopenia
- B. Laboratory evidence of hemolysis
- C. Abnormal PT and aPTT
- D. Microvascular thrombosis

*Thrombotic thrombocytopenic microangiopathies are characterized by thrombocytopenia, microangiopathic hemolytic anemia, laboratory evidence of hemolysis & microvascular thrombosis. It includes thrombotic thrombocytopenic purpura (TTP) & hemolytic uremic syndrome (HUS). PT & aPTT are characteristically normal in TTP or HUS and is used to differentiate TTP from DIC. Despite thrombocytopenia, severe bleeds are uncommon. Neurologic changes are common in TTP, renal failure in HUS & neurologic or renal changes are absent in HELLP.***913 Thrombotic thrombocytopenic purpura (TTP) was first described by ?***Harrison's 18th Ed. 969*

- A. Balint
- B. Eli Moschowitz
- C. Verner-Morrison
- D. Wiskott-Aldrich

*TTP was initially described by Dr Eli Moschowitz at the Mount Sinai Hospital in New York City in 1924. Thrombotic thrombocytopenic purpura (TTP) is also called Moschowitz disease.***914 Which of the following is not a feature of TTP ?***Harrison's 18th Ed. 969*

- A. Microangiopathic hemolytic anemia
- B. Renal failure
- C. Hepatic failure
- D. Neurologic dysfunction

*TTP is characterized by a pentad of findings that include microangiopathic hemolytic anemia, thrombocytopenia, renal failure, neurologic findings, and fever. Schistocytes are typically seen in PBF.***915 Upshaw-Schulman syndrome is related to ?***Harrison's 18th Ed. 969*

- A. Multiple transfusions
- B. Thrombotic thrombocytopenic purpura

- C. Uremia
- D. CHF

Upshaw Schulman syndrome is due to a hereditary deficiency of a metalloprotease that cleaves vWF which is normally secreted as ultra-large multimers. It is cleaved by ADAMTS13. Persistence of ultra-large vWF molecules produces pathogenic platelet adhesion & aggregation.

916 Upshaw-Schulman syndrome is best related to ?

Harrison's 18th Ed. 969

- A. Idiopathic TTP
- B. Inherited TTP
- C. Medication-related TTP
- D. TTP in pregnant women

Hereditary form of TTP is called Upshaw-Schulman syndrome. It is due to inherited deficiency of or antibodies to the plasma metalloprotease ADAMTS13. 5-10% of all TTP cases are due to Upshaw-Schulman syndrome.

917 Idiopathic TTP is more common in ?

Harrison's 17th Ed. 722

- A. Women
- B. HIV infection
- C. Pregnant women
- D. All of the above

Idiopathic TTP is more common in women, HIV infection & in pregnant women.

918 Which of the following antiplatelet agent has been implicated in the causation of TTP ?

Harrison's 17th Ed. 722

- A. Aspirin
- B. Ticlopidine
- C. Carvadilol
- D. All of the above

Medication-related TTP may be secondary to antibody formation (ticlopidine) or direct endothelial toxicity (cyclosporine, mitomycin C, tacrolimus, quinine).

919 In TTP, hyaline thrombi without inflammatory changes in vessel wall may be found in ?

Harrison's 16th Ed. 679

- A. Arterioles
- B. Capillaries
- C. Venules
- D. All of the above

Presence of hyaline thrombi in arterioles, capillaries & venules without any inflammatory changes in the vessel wall is diagnostic of TTP.

920 Severity of TTP is estimated by the degree of ?

Harrison's 16th Ed. 679

- A. Anemia
- B. Thrombocytopenia
- C. Serum LDH level
- D. All of the above

921 Which of the following is not a feature of TTP ?

Harrison's 16th Ed. 679

- A. Severe Coombs-positive hemolytic anemia
- B. Near normal prothrombin time
- C. Near normal fibrinogen level

- D. Near normal FDP level

Presence of severe Coombs-negative hemolytic anemia with schistocytes or fragmented RBC's in PBF, with thrombocytopenia & minimal activation of coagulation system confirm diagnosis of TTP.

922 Which of the following supports the diagnosis of TTP ?

Harrison's 17th Ed. 723

- A. Increased lactate dehydrogenase
- B. Increased indirect bilirubin
- C. Decreased haptoglobin
- D. All of the above

Findings that support the diagnosis of TTP include increased LDH, increased indirect bilirubin, decreased haptoglobin, increased reticulocyte count, negative direct antiglobulin test, schistocytes in PBF and polychromasia.

923 Mainstay of treatment of idiopathic TTP is ?

Harrison's 17th Ed. 723

- A. Rituximab
- B. IV Ig
- C. Plasma exchange
- D. Splenectomy

Plasma exchange remains the mainstay of treatment of ITP idiopathic TTP.

924 Which of the following is false about TTP ?

Harrison's 18th Ed. 969

- A. TTP is more common in HIV patients and pregnant women
- B. Coagulation studies are essentially normal in TTP
- C. Severe bleeds are usually absent
- D. None of the above

925 Which of the following is false about Weibel-Palade bodies ?

- A. Are organelles in the vascular endothelium
- B. Major constituents of Weibel-Palade bodies are von Willebrand factor (vWF) and P-selectin
- C. George Emil Palade won the Nobel Prize in Physiology or Medicine in 1974
- D. None of the above

926 Which of the following is false about Weibel-Palade bodies (WPBs) ?

- A. Weibel-Palade bodies play a dual role in blood coagulation hemostasis and inflammation
- B. Weibel-Palade bodies are the main source of vWF
- C. Weibel-Palade bodies are secretory organelles used for post-synthesis storage in endothelial cells.
- D. None of the above

927 TTP is due to deficiency in the activity of ?

Harrison's 18th Ed. 969

- A. ADAMTS 11
- B. ADAMTS 12
- C. ADAMTS 13
- D. ADAMTS 14

ADAMTS 13 is a member of ADAMTS (a disintegrin with thrombospondin type 1 motifs) zinc metalloproteinase family that cleaves vWF complexes & prevents vWF-platelet interaction. Severe deficiency of ADAMTS causes TTP.

928 Which of the following is related to TTP ?*Harrison's 18th Ed. 969*

- A. ADAMTS-10
- B. ADAMTS-11
- C. ADAMTS-12
- D. ADAMTS-13

Plasma metalloprotease ADAMTS-13 (vWF-cleaving protease) is responsible for proteolytic cleavage of large hemostatically hyperactive vWf multimers that are synthesized and secreted by endothelial cells in plasma into smaller less adhesive multimers. ADAMTS-13 prevents inappropriate microvascular platelet aggregation. Deficiency of ADAMTS-13 results in TTP. The relationship of reduced ADAMTS13 to the pathogenesis of TTP is known as the Furlan-Tsai hypothesis.

929 Which of the following is false about ADAMTS-13 ?

- A. ADAMTS-13 prevents inappropriate microvascular platelet aggregation
- B. Deficiency of ADAMTS-13 is a finding for TTP
- C. vWf multimers is the physiologic substrate for ADAMTS-13
- D. None of the above

Various studies support the clinical diagnosis of TTP when ADAMTS-13, the vWf-cleaving protease, activity is less than 5% of the activity in normal human plasma.

930 Which of the following is false about ADAMTS-13 ?

- A. ADAMTS refers to "A Disintegrin-like And Metalloprotease with ThromboSpondin type 1 motif"
- B. Human ADAMTS-13 gene is on chromosome 9q34
- C. ADAMTS-13 molecule depends upon zinc and calcium ions for activity
- D. None of the above

931 Findings in TTP include ?*N Engl J Med 2006;354:1927-35*

- A. Abdominal pain, nausea, vomiting and weakness
- B. Seizures and fluctuating focal deficits
- C. Thrombocytopenia without leukopenia
- D. All of the above

932 Which of the following laboratory finding does not support diagnosis of TTP ?*Harrison's 18th Ed. 970*

- A. Increased lactate dehydrogenase
- B. Increased direct bilirubin
- C. Decreased haptoglobin
- D. Increased reticulocyte count

Laboratory finding that support diagnosis of TTP include increased LDH, increased "indirect bilirubin", decreased haptoglobin, increased reticulocyte count with negative direct antiglobulin test. PBF shows schistocytes and polychromasia.

933 Which of the following is not used in the treatment of TTP ?

- A. Platelet concentrates
- B. Plasma exchange
- C. Fresh-frozen plasma (FFP)
- D. Solvent/detergent-treated plasma (SD-FFP)

Plasma exchange remains the mainstay of treatment of TTP. Use of platelet concentrates and Desmopressin, or DDAVP in the treatment of TTP is contraindicated as it leads to extensive platelet aggregation in the CNS.

934 Immunomodulatory therapies reported to be successful in refractory or relapsing TTP include ?*Harrison's 18th Ed. 970*

- A. Rituximab
- B. Vincristine
- C. Cyclophosphamide
- D. All of the above

Immunomodulatory therapies reported to be successful in refractory or relapsing TTP include rituximab, vincristine, cyclophosphamide, and splenectomy.

935 Hemolytic Uremic Syndrome is a disease of ?*Harrison's 18th Ed. 970*

- A. Infancy and early childhood
- B. Adolescence
- C. Adults
- D. Elderly

HUS is seen predominantly in children.

936 Features of Hemolytic Uremic Syndrome include all except ?*Harrison's 18th Ed. 970*

- A. Chronic renal failure
- B. Microangiopathic hemolytic anemia
- C. Thrombocytopenia
- D. Frequently preceded by an episode of diarrhea

HUS is a syndrome characterized by acute renal failure, microangiopathic hemolytic anemia, and thrombocytopenia. In most cases is preceded by an episode of diarrhea. Escherichia coli O157:H7 is the most frequent etiologic serotype. Plasma exchange treatment is not appropriate for hemolytic-uremic syndrome.

937 Thrombocytosis is due to deficiency of ?*Harrison's 18th Ed. 970*

- A. Vitamin B12
- B. Folic acid
- C. Iron
- D. Calcium

Thrombocytosis is almost always due to iron deficiency, reactive thrombocytosis (inflammation, cancer, infection) or underlying myeloproliferative process (essential thrombocythemia or PV).

938 In which of the following disorders, there is absence of the platelet GpIbIIIa receptor ?*Harrison's 18th Ed. 970*

- A. Glanzmann's thrombasthenia
- B. Bernard Soulier syndrome
- C. Hermansky-Pudlak syndrome
- D. Heyde's syndrome

Autosomal recessive inherited qualitative disorders of platelet function include Glanzmann's thrombasthenia (absence of the platelet GpIbIIIa receptor) and Bernard Soulier syndrome (absence of the platelet GpIb-IX-V receptor). Edward Glanzmann - Swiss physician (1918)

939 Bleeding symptoms or prevention of bleeding in patients in inherited disorders of platelet dysfunction include ?*Harrison's 18th Ed. 971*

- A. Prestorage leukodepleted platelets transfusion
- B. Desmopressin (DDAVP)
- C. EACA or tranexamic acid
- D. All of the above

In platelet transfusion, risk of alloimmunization can be limited by using prestorage leukodepleted platelets. Desmopressin (DDAVP) increases plasma vWF & FVIII levels. Antifibrinolytic therapy (EACA or tranexamic acid) is used alone or in conjunction with DDAVP or platelet therapy.

- 940 Acquired platelet dysfunction can occur in ?**
Harrison's 18th Ed. 971
- A. Uremia
 - B. High dose penicillins
 - C. With cardiopulmonary bypass
 - D. All of the above
- 941 Acquired platelet dysfunction due to uremia, respond to ?**
Harrison's 18th Ed. 971
- A. Dialysis
 - B. DDAVP
 - C. Conjugated estrogens
 - D. All of the above
- 942 Most common inherited bleeding disorder is ?**
Harrison's 18th Ed. 971
- A. Glanzmann's thrombasthenia
 - B. Bernard Soulier syndrome
 - C. von Willebrand Disease
 - D. Hemophilia

von Willebrand Disease (vWD) is the most common inherited bleeding disorder with prevalence of ~1%. vWD affects both males & females, while hemophilia mainly affects males.

- 943 Nationality of Dr. Erik von Willebrand was ?**
- A. French
 - B. Finnish
 - C. Spanish
 - D. Danish

In 1925, Dr. Erik von Willebrand of Finland observed a disorder that was due to a disturbed function of thrombocytes and a general lesion of capillary walls and called it "pseudohemophilia".

- 944 Normal plasma vWF level is ?**
Harrison's 16th Ed. 676
- A. 4 mg/L
 - B. 6 mg/L
 - C. 8 mg/L
 - D. 10 mg/L

The normal plasma vWF level is 10 mg/L.

- 945 Which of the following vWD is not inherited as autosomal dominant trait?**
Harrison's 16th Ed. 676
- A. Type I
 - B. Type IIA
 - C. Type IIB
 - D. Type III

Except type III vWF disease, all forms are inherited as autosomal dominant traits.

- 946 Which of the following vWD type is most common ?**
Harrison's 16th Ed. 676
- A. Type I
 - B. Type IIA

- C. Type IIB
- D. Type III

Type I vWF disease is most common. There is mild to moderate decrease in plasma vWF.

- 947 Which of the following vWD type is most severe ?**
Harrison's 16th Ed. 676
- A. Type I
 - B. Type IIA
 - C. Type IIB
 - D. Type III

Type III vWF disease is a very severe form of vWD with no detectable vWF antigen or activity. Patients are usually the offspring of two parents (usually asymptomatic) with mild type I disease.

- 948 Which of the following is not a functional platelet disorder of adhesion ?**
Harrison's 16th Ed. 676
- A. von Willebrand's disease (vWD)
 - B. Glanzmann's thrombasthenia
 - C. Bernard-Soulier syndrome
 - D. Uremia

Functional platelet disorders of adhesion are either inherited (Bernard-Soulier syndrome, von Willebrand's disease), or acquired (Uremia, acquired vWD).

- 949 Which of the following is a functional platelet disorder of aggregation ?**
Harrison's 16th Ed. 676
- A. Glanzmann's thrombasthenia
 - B. Bernard-Soulier syndrome
 - C. Chediak-Higashi syndrome
 - D. Hermansky-Pudlak syndrome

Functional platelet disorders of aggregation are either inherited (Glanzmann's thrombasthenia, afibrinogenemia) or acquired (fibrin degradation product inhibition, dysproteinemias, drug induced - ticlopidine, Gp IIb/IIIa inhibitors)

- 950 Which of the following is not a functional platelet disorder of granule release ?**
Harrison's 16th Ed. 676
- A. Hermansky-Pudlak syndrome
 - B. Chediak-Higashi syndrome
 - C. von Willebrand's disease (vWD)
 - D. Gray-platelet syndrome

Functional platelet disorders of granule release are inherited (Hermansky-Pudlak syndrome, Chediak-Higashi syndrome, isolated dense (δ) granule deficiency, Gray-platelet syndrome or acquired (cardiopulmonary bypass, myeloproliferative disorders, drug induced - aspirin, NSAIDs).

- 951 Which of the following is a platelet aggregation agonist ?**
Harrison's 16th Ed. 676
- A. ADP
 - B. Thrombin
 - C. Epinephrine
 - D. All of the above

Agonists of platelet aggregation are adenosine diphosphate (ADP), thrombin or epinephrine.

- 952 vWF precursor subunit is synthesized in ?**
Harrison's 16th Ed. 676
- A. Endothelial cells

- B. Platelets
- C. Vascular subendothelium
- D. All of the above

A single large vWF precursor subunit is synthesized in endothelial cells & megakaryocytes, where it is cleaved & assembled into disulfide-linked multimers in plasma, platelets, & subendothelium.

953 Which of the following is false in diagnostic pattern of vWD ?

Harrison's 16th Ed. 676

- A. Prolonged clotting time
- B. Reduced vWF concentration
- C. Reduced vWF biologic activity
- D. Reduced factor VIII activity

Lab. diagnostic findings in vWD are prolonged BT, reduction in plasma vWF level, a parallel reduction in vWF biologic activity by ristocetin cofactor assay and reduced factor VIII activity.

954 Which of the following vWD is due to a defect in factor VIII binding site of vWF ?

Harrison's 16th Ed. 677

- A. Type I
- B. Type II
- C. Type IIa
- D. Type III

Type IIa vWD is due to a defect in factor VIII binding site of vWF.

955 Patients of which type of vWD are the best candidates for desmopressin therapy ?

Harrison's 16th Ed. 677

- A. Type I
- B. Type IIa
- C. Type IIb
- D. Type III

Patients with type I vWD are the best candidates for desmopressin therapy.

956 vWD may be acquired in which of the following situations ?

Harrison's 17th Ed. 724

- A. Monoclonal gammopathies of undetermined significance
- B. Waldenstrom's macroglobulinemia
- C. Multiple myeloma
- D. All of the above

Acquired vWD is mostly seen in patients with underlying lymphoproliferative disorders like MGUS, multiple myeloma & Waldenstrom's macroglobulinemia.

957 In which of the following diseases, platelets are deficient or defective in Gp IIb/IIIa complex ?

Harrison's 17th Ed. 723

- A. Bernard-Soulier syndrome
- B. Glanzmann's thrombasthenia
- C. Hermansky-Pudlak syndrome
- D. Chediak-Higashi syndrome

958 In which of the following diseases, platelets have deficiency or dysfunction of the Gp Ib/IX complex ?

Harrison's 17th Ed. 723

- A. Bernard-Soulier syndrome
- B. Glanzmann's thrombasthenia

- C. Hermansky-Pudlak syndrome
- D. Chediak-Higashi syndrome

Inherited platelet function qualitative disorders include autosomal recessive disorders like Glanzmann's thrombasthenia (absence of platelet GpIIb/IIIa receptor) & Bernard Soulier syndrome (absence of platelet GpIb-IX-V receptor). Both present with bleeding symptoms in childhood.

959 Which of the following is not an autosomal recessive trait ?

Harrison's 17th Ed. 723

- A. Bernard-Soulier syndrome
- B. Glanzmann's thrombasthenia
- C. von Willebrand's disease Type II
- D. von Willebrand's disease Type III

960 In Heyde's syndrome, which of the following is a feature apart from aortic stenosis ?

Harrison's 17th Ed. 724

- A. Raynaud's phenomenon
- B. Gastrointestinal bleeding
- C. Clubbing
- D. Pes cavus

Heyde's syndrome refers to aortic stenosis with GI bleeding due to angiodysplasia of GI tract.

961 Which of the following platelet aggregation agonists require fibrinogen for binding ?

Harrison's 17th Ed. 363

- A. Adenosine diphosphate (ADP)
- B. Thrombin
- C. Epinephrine
- D. All of the above

Platelet activation & then aggregation occurs after platelet adhesion. This process is promoted by humoral mediators (epinephrine, thrombin), mediators from activated platelets (ADP, serotonin) & vessel wall extracellular matrix constituents in contact with adherent platelets (collagen, vWF).

962 In platelet granules, which of the following is "adhesive glycoprotein" ?

Harrison's 16th Ed. 678

- A. Thrombospondin
- B. Fibronectin
- C. vWF
- D. All of the above

963 von Willebrand factor gene is located on which chromosome ?

N Engl J Med 2004;351:683-94

- A. 10
- B. 11
- C. 12
- D. 13

von Willebrand factor is a large multimeric glycoprotein that is encoded by a gene spanning 178 kb of genomic DNA on chromosome 12.

964 Most common type of vWD is ?

Harrison's 18th Ed. 971

- A. Type 1
- B. Type 2A
- C. Type 2B

D. Type 3

vWD is classified into three major types 1, 2 and 3. Type 2 has four subtypes. The most common type of vWD is type 1 disease (80%).

965 Which of the following vWD is inherited as autosomal recessive trait ?

N Engl J Med 2004;351:683-94

- A. Type 1
- B. Type 2A
- C. Type 2B
- D. Type 3

Type 3 vWD, which accounts for 1 - 5 % percent of cases, is transmitted as an autosomal recessive trait in homozygous or compound heterozygous persons.

966 vWF protein levels are lowest in which of the following blood groups ?

Harrison's 18th Ed. 972

- A. A
- B. B
- C. AB
- D. O

Patients with "O" blood group have vWF protein levels about one-half those of patients with AB blood type.

967 Which of the following is called "severe vWD" ?

Harrison's 18th Ed. 972

- A. Type 1
- B. Type 2A
- C. Type 2B
- D. Type 3

Type 3 vWD refers to severe vWD - patients with virtually no vWF antigen and FVIII levels <10%.

968 Which type of vWD reflects mutations in vWF that preclude binding of FVIII ?

Harrison's 18th Ed. 972

- A. Type 2A
- B. Type 2B
- C. Type 2M
- D. Type 2N

Type 2N vWD reflects mutations in vWF that preclude binding of FVIII.

969 Which type of vWD is termed "autosomal hemophilia" ?

Harrison's 18th Ed. 972

- A. Type 2A
- B. Type 2B
- C. Type 2M
- D. Type 2N

In type 2N vWD, FVIII has a very short half-life and level is markedly decreased. This is termed autosomal hemophilia. Type 2N vWD is due to abnormal FVIII binding sites. It is distinguished from haemophilia A by the finding of normal vWF:Ag levels and limitation of the disorder to males in inherited haemophilia A.

970 Acquired vWD is seen most commonly in ?

Harrison's 18th Ed. 972

- A. Monoclonal gammopathies of undetermined significance
- B. Multiple myeloma

C. Waldenstrom's macroglobulinemia

D. None of the above

Acquired vWD is seen most commonly in MGUS.

971 Which of the following best relates to Heyde's syndrome ?

Harrison's 18th Ed. 972

- A. Cirrhosis of liver
- B. Angiodysplasia of gastrointestinal tract
- C. Pancreatic neoplasia
- D. Ectopic spleen

Heyde's syndrome refers to aortic stenosis with gastrointestinal bleeding due to presence of angiodysplasia of gastrointestinal tract in patients with aortic stenosis. Shear stress on blood passing through stenotic aortic valve produces change in vWF, making it susceptible to serum proteases with loss of large multimer forms, leading to acquired type 2 vWD.

972 Which of the following is false in von Willebrand Disease ?

Harrison's 18th Ed. 972

- A. Prolonged BT
- B. Normal platelet count
- C. Increased APTT
- D. Decreased plasma vWF concentration

Laboratory findings in vWD are variable. Most common diagnostic pattern is prolonged BT, normal platelet count, CT, PT, increased APTT, decreased plasma vWF concentration, reduction in its vWF biologic activity (ristocetin cofactor assay) and reduced FVIII activity. Bleeding time is normal in hemophilia A.

973 Platelet count are modestly reduced in which of the following types of vWD ?

Harrison's 18th Ed. 972

- A. Type 1
- B. Type 2A
- C. Type 2B
- D. Type 3

Platelet counts are within the normal range in vWD except in type 2B vWD where mild thrombocytopenia may be seen and may be misdiagnosed as autoimmune thrombocytopenia. RIPA (Ristocetin induced platelet aggregation) shows a low to absent response in all vWD types except type 2B vWD where a brisk platelet aggregation is seen even at low concentrations.

974 What is the nature of "Ristocetin" ?

N Engl J Med 2004;351:683-94

- A. Analgesic
- B. Antibiotic
- C. Uterine relaxant
- D. Digestive enzyme

975 In which of the following vWD, vWF: Ag is normal ?

Harrison's 18th Ed. 972

- A. Type 1
- B. Type 2A
- C. Type 2B
- D. Type 3

976 In which of the following vWD, vWF: Ag is normal ?

Harrison's 18th Ed. 972

- A. Type 2M
- B. Type 2N
- C. Type 2B

D. Type 3

Normal vWF:Ag levels do not exclude vWD. vWF levels are just below normal in type 1, normal in type 2A and 2M, usually decreased in 2B and 2N and nearly to completely absent in type 3 vWD.

977 Desmopressin acts through which of the following vasopressin receptors ?

N Engl J Med 2004;351:683-94

- A. Type 1
- B. Type 2
- C. Type 3
- D. Type 4

Desmopressin is a synthetic derivative of antidiuretic hormone that acts through type 2 vasopressin receptors. It has no activity on type 1 receptors.

978 Dose of Desmopressin is ?

Harrison's 18th Ed. 972, N Engl J Med 2004;351:683-94

- A. 0.3 µg / kg body weight IV infusion
- B. 3.0 µg / kg body weight IV infusion
- C. 30 µg / kg body weight IV infusion
- D. 300 µg / kg body weight IV infusion

Desmopressin is given in a dose of 0.3 µg / kg body weight IV infusion for 30 minutes.

979 DDAVP, or desmopressin is most effective for treatment of which type of von Willebrand disease ?

Harrison's 18th Ed. 972

- A. Type 1
- B. Type 2A
- C. Type 2B
- D. Type 3

Type 1 vWD is best treated with DDAVP (desmopressin), which results in release of vWF and FVIII from endothelial stores. DDAVP is a synthetic hormone given IV injection or by nasal spray.

980 DDAVP, or desmopressin is not indicated in which type of von Willebrand disease ?

Harrison's 18th Ed. 972

- A. Type 1
- B. Type 2A
- C. Type 2B
- D. Type 2M

Desmopressin or DDAVP is not recommended in type 2B where it is known to aggravate thrombocytopenia.

981 Antifibrinolytic amino acids like Aminocaproic acid or tranexamic acid used in treatment of vWD can cause which of the following complications ?

Harrison's 18th Ed. 972

- A. Cholelithiasis
- B. Ureteral obstruction
- C. Glaucoma
- D. Alopecia

Antifibrinolytic amino acids are contraindicated in patients with upper UTI or gross hematuria because clots that do not lyse may cause ureteral obstruction.

982 In type 3 vWD, which of the following is the treatment of first choice in patients with alloantibodies ?

N Engl J Med 2004;351:683-94

- A. Desmopressin

- B. Factor VIII–von Willebrand factor concentrates
- C. Recombinant factor VIII
- D. Platelet concentrates

Henoch-Schönlein purpura

983 Which of the following is a Primary Vasculitis Syndrome ?

Harrison's 18th Ed. 2797

- A. Wegener's granulomatosis
- B. Churg-Strauss syndrome
- C. Henoch-Schönlein purpura
- D. All of the above

Primary vasculitis syndromes include Wegener's granulomatosis, Churg-Strauss syndrome, Henoch-Schönlein purpura, Polyarteritis nodosa, Microscopic polyangiitis, Giant cell arteritis, Takayasu's arteritis, Idiopathic cutaneous vasculitis, Essential mixed cryoglobulinemia, Behçet's syndrome, Isolated vasculitis of CNS, Cogan's syndrome & Kawasaki disease.

984 Henoch-Schönlein purpura is also referred to as ?

Harrison's 18th Ed. 2797

- A. Anaphylactoid purpura
- B. Purple purpura
- C. Emergent purpura
- D. Sympathetic purpura

Henoch-Schönlein purpura is also referred to as anaphylactoid purpura.

985 Henoch-Schönlein purpura lesions are most commonly distributed over ?

Harrison's 18th Ed. 2797

- A. Buttocks and lower extremities
- B. Neck and upper limbs
- C. Chest and abdomen
- D. Face

In Henoch-Schönlein purpura, palpable purpura lesions are most commonly distributed over buttocks and lower extremities.

986 Henoch-Schönlein purpura is often preceded by ?

Harrison's 18th Ed. 2797

- A. Trauma
- B. Conjunctivitis
- C. Upper respiratory infection
- D. Exercise

Henoch-Schönlein purpura is often preceded by an upper respiratory infection (streptococcal pharyngitis) or is triggered by drug or food allergies.

987 Henoch-Schönlein purpura is a ?

Harrison's 18th Ed. 2797

- A. Small vessel vasculitis
- B. Medium vessel vasculitis
- C. Large vessel vasculitis
- D. All of the above

Henoch-Schönlein purpura is a small-vessel vasculitis.

988 Which of the following is false about Henoch-Schönlein purpura ?

Harrison's 18th Ed. 2797

- A. Mostly in age between 4 - 7 years

- B. Male-to-female ratio is 1.5:1
- C. Peak incidence in spring
- D. None of the above

Most patients of HSP are between 4 - 7 years of age. Male-to-female ratio is 1.5:1. Peak incidence in spring has been noted. All coagulation tests are normal.

989 In Henoch-Schönlein purpura, the antibody class most often seen in the immune complexes is ?

Harrison's 18th Ed. 2797

- A. IgA
- B. IgG
- C. IgM
- D. IgE

IgA is the antibody class most often seen in immune complexes and demonstrated in renal biopsies of HSP patients. IgA levels are elevated in ~half of patients.

990 In pediatric patients, which of the following is the most common presentation in HSP ?

Harrison's 18th Ed. 2797

- A. Palpable purpura
- B. Gastrointestinal involvement
- C. Glomerulonephritis
- D. Arthritis

In pediatric HSP, palpable purpura is seen in virtually all patients.

991 Henoch-Schönlein purpura is best related to ?

Harrison's 18th Ed. 2797

- A. Leukocytoclastic vasculitis (LCV)
- B. Livedoid vasculitis
- C. Necrotizing vasculitis
- D. Systemic vasculitis

HSP is a subtype of acute LCV. Livedoid vasculitis represents a combination of a vasculopathy plus intravascular thrombosis.

992 Which of the following statements about renal involvement in Henoch-Schönlein purpura is false ?

Harrison's 18th Ed. 2797

- A. Proteinuria
- B. Microscopic hematuria
- C. Red blood cell casts
- D. Progressive glomerulonephritis frequent

993 Which of the following statements about renal involvement in Henoch-Schönlein purpura is false ?

Harrison's 18th Ed. 2797

- A. Usually resolves spontaneously without therapy
- B. Progressive glomerulonephritis rare
- C. Renal failure is the most common cause of death
- D. None of the above

Renal involvement occurs in 10 - 50% of HSP patients. Mild glomerulonephritis, proteinuria, microscopic hematuria, with RBC casts occurs in the majority. it resolves spontaneously without therapy. Rarely, a progressive glomerulonephritis will develop.

994 Which of the following statements about gastrointestinal involvement in Henoch-Schönlein purpura is false ?

Harrison's 18th Ed. 2797

- A. Colicky abdominal pain

- B. Blood and mucus per rectum
- C. Bowel intussusception
- D. None of the above

995 In Henoch-Schönlein purpura, mesangial immune deposits consists of ?

Harrison's 18th Ed. 2797

- A. IgA
- B. IgG
- C. C3
- D. All of the above

996 In Henoch-Schönlein purpura, immune deposits may be found in ?

Harrison's 18th Ed. 2797

- A. Mesangial and paramesangial areas
- B. Peripheral glomerular capillary wall
- C. Small arterioles
- D. All of the above

HSP patients have an acute inflammatory reaction with IgA and complement components in capillaries, mesangial tissues, and small arterioles, leading to increased vascular permeability and localized hemorrhage.

Chapter 116. Coagulation Disorders

997 Factor X or Stuart-Prower factor is named after ?

- A. Patients - Ms. Audrey Prower & Mr. Rufus Stuart
- B. Doctors - Ms. Audrey Prower & Mr. Rufus Stuart
- C. Scientists - Ms. Audrey Prower & Mr. Rufus Stuart
- D. Politicians - Ms. Audrey Prower & Mr. Rufus Stuart

Factor X, or Stuart-Prower factor was identified in Ms. Audrey Prower of London, who had life-long bleeding tendency. An American group identified the same factor in Mr. Rufus Stuart (1957).

998 Coagulation-related protein prekallikrein is also called ?

- A. Fletcher Factor
- B. Fitzgerald Factor
- C. MacFarlane Factor
- D. Furie Factor

Fletcher Factor and Fitzgerald Factor are coagulation-related proteins prekallikrein and high-molecular-weight kininogen respectively.

999 Factor IX or Christmas Factor is named after ?

- A. Patient - Stephen Christmas
- B. Doctor - Stephen Christmas
- C. Scientist - Stephen Christmas
- D. Politician - Stephen Christmas

Stephen Christmas (1947-1993) of Canada suffered from hemophilia B. He died due to transfusion-related AIDS.

1000 An isolated abnormal prothrombin time (PT) suggests deficiency of ?

Harrison's 18th Ed. 973

- A. FV
- B. FVI

- C. FVII
- D. FVIII

1001 Prolonged activated partial thromboplastin time indicates ?*Harrison's 18th Ed. 973*

- A. FII deficiency
- B. FV deficiency
- C. FVIII deficiency
- D. FX deficiency

1002 Prolongation of both PT & aPTT suggests deficiency of ?*Harrison's 18th Ed. 973*

- A. FV
- B. FX
- C. FII
- D. All of the above

An isolated abnormal prothrombin time (PT) suggests FVII deficiency. A prolonged activated partial thromboplastin time (aPTT) indicates most commonly hemophilia or FXI deficiency. The prolongation of both PT & aPTT suggests deficiency of FV, FX, FII or fibrinogen abnormalities. Patients with hemophilia have normal bleeding times & platelet counts.

1003 Which of the following is a test for blood coagulation ?*Harrison's 18th Ed. 973*

- A. PT
- B. aPTT
- C. Thrombin time (TT)
- D. All of the above

1004 Which of the following is an example of acquired deficiencies of plasma coagulation ?*Harrison's 18th Ed. 973*

- A. Hemorrhagic diathesis of liver disease
- B. Disseminated intravascular coagulation (DIC)
- C. Vitamin K deficiency
- D. All of the above

Acquired deficiencies of plasma coagulation factors are more frequent than congenital disorders. Most common disorders include hemorrhagic diathesis of liver disease, disseminated intravascular coagulation (DIC), and vitamin K deficiency. Blood coagulation is hampered by the deficiency of more than one clotting factor.

1005 Which of the following could lead to a prolonged aPTT and normal PT ?*N Engl J Med 2009;361:1887-94*

- A. Deficiency of factor VIII, IX, or XI
- B. Von Willebrand's disease
- C. Unfractionated heparin
- D. All of the above

Deficiency of factor VIII, IX, or XI, Inhibitor of factor VIII, IX, or XI, Von Willebrand's disease, Unfractionated heparin and Direct thrombin inhibitors cause a prolonged aPTT and normal PT.

1006 Which of the following could lead to a prolonged PT and normal aPTT ?*N Engl J Med 2009;361:1887-94*

- A. Deficiency of factor VII
- B. Vitamin K deficiency
- C. Warfarin therapy
- D. All of the above

Deficiency of factor VII, Inhibitor of factor VII, Vitamin K deficiency, Liver disease and Warfarin therapy could lead to a prolonged PT and normal aPTT.

1007 Which of the following could lead to a prolonged aPTT and prolonged PT ?*N Engl J Med 2009;361:1887-94*

- A. Deficiency of prothrombin, fibrinogen, factor V or X
- B. Supratherapeutic doses of heparin or warfarin
- C. Disseminated intravascular coagulation
- D. All of the above

Deficiency of prothrombin, fibrinogen, factor V, or factor X, Inhibitor of prothrombin, fibrinogen, factor V, or factor X, Supratherapeutic doses of heparin or warfarin, Liver disease, Disseminated intravascular coagulation and Argatroban could lead to a prolonged aPTT and prolonged PT

1008 Which of the following is a disorder of primary hemostasis ?*N Engl J Med 2009;361:1887-94*

- A. Thrombocytopenia
- B. Qualitative platelet disorders
- C. von Willebrand's disease
- D. All of the above

1009 Which of the following royal persons was a clinically normal carrier of hemophilia ?*N Engl J Med 2001;344:1773*

- A. Queen Marie
- B. Queen Elizabeth I
- C. Queen Victoria
- D. Queen Harper

Queen Victoria, a clinically normal carrier of hemophilia, had one son, Leopold, who had hemophilia and two daughters, Alice and Beatrice, who were carriers and who, in turn, transmitted the disease to the Russian, Prussian, and Spanish royal families.

1010 World Hemophilia Day is observed on ?

- A. April 17
- B. May 17
- C. June 17
- D. July 17

1011 What is the prevalence of hemophilia ?*Harrison's 18th Ed. 974*

- A. 1 in 10,000 males worldwide
- B. 1 in 100,000 males worldwide
- C. 1 in 10,00000 males worldwide
- D. 1 in 10,000000 males worldwide

Hemophilia is an X-linked recessive hemorrhagic disease due to mutations in the F8 gene (hemophilia A or classic hemophilia) or F9 gene (hemophilia B). The disease affects 1 in 10,000 males worldwide, in all ethnic groups.

1012 Most common hemophilia A F8 mutations results from ?*Harrison's 18th Ed. 974*

- A. Inversion of intron 22 DNA sequence
- B. Inversion of intron 23 DNA sequence
- C. Inversion of intron 24 DNA sequence
- D. Inversion of intron 25 DNA sequence

40 to 50 percent of the mutations causing severe hemophilia A are due to an inversion of DNA sequences in intron 22 that disrupts factor VIII gene.

1013 Family history of hemophilia is absent in what percentage of cases of hemophilia ?

Harrison's 18th Ed. 974

- A. ~10 %
- B. ~20 %
- C. ~30 %
- D. ~40 %

Hemophilia affects males, women, who carry a single mutated gene, are generally asymptomatic. Family history of the disease is absent in ~30% of cases and arise from a spontaneous mutation..

1014 The minimal level of most clotting factors needed for adequate hemostasis is ?

Harrison's 18th Ed. 974

- A. 5 %
- B. 10 %
- C. 15 %
- D. 25 %

Those with residual FVIII or FIX activity >25% of normal, hemophilia is discovered only by bleeding after major trauma or during presurgery laboratory tests.

1015 Clinically, hemophilia is classified as severe when residual activity of FVIII is ?

Harrison's 18th Ed. 974

- A. < 1%
- B. < 2%
- C. < 3%
- D. < 4%

When residual activity of FVIII or FIX is < 1%, hemophilia is classified as severe. Between 1 - 5%, it is moderate. Between 6 - 30%, it is mild.

1016 One unit of factor VIII is defined as the amount of factor VIII present in ?

Harrison's 18th Ed. 975

- A. 1 mL normal plasma
- B. 10 mL normal plasma
- C. 100 mL normal plasma
- D. 1000 mL normal plasma

One unit is by definition the amount of FVIII (100 ng/mL) or FIX (5 g/mL) in 1 mL of normal plasma. One unit of FVIII per kilogram of body weight increases the plasma FVIII level by 2%.

1017 Factor VIII has a half-life of ?

Harrison's 18th Ed. 975

- A. 1 to 4 hours
- B. 4 to 8 hours
- C. 8 to 12 hours
- D. 12 to 16 hours

FVIII half-life of 8 to 12 hours, therefore requires twice a day administration to maintain therapeutic levels. Half-life of FIX is about 24 hours.

1018 Which of the following is false about antihemophilic factor (AHF) ?

Harrison's 17th Ed. 680

- A. Multiple-chain protein
- B. Synthesized in liver
- C. Circulates complexed to vWF protein
- D. None of the above

1019 Which of the following is false about antihemophilic factor (AHF) ?

Harrison's 17th Ed. 680

- A. Regulates activation of factor X
- B. Gene for factor VIII is on the X chromosome
- C. Symptomatic patients have factor VIII levels of < 5 %
- D. None of the above

1020 Which of the following is false about hemophilia A ?

Harrison's 17th Ed. 682

- A. Severe iron-deficiency anemia is uncommon
- B. Patients with type I inhibitor should not receive factor VIII
- C. Prenatal diagnosis from chorionic villus biopsy or amniocentesis possible
- D. None of the above

1021 Which of the following medicines is useful in managing bleeding in hemophilia patients ?

Harrison's 18th Ed. 976

- A. Desmopressin (DDAVP)
- B. ε aminocaproic acid (EACA)
- C. Tranexamic acid
- D. All of the above

DDAVP is a synthetic vasopressin analogue that causes a transient rise in FVIII and vWF, but not FIX, in patients with mild to moderate hemophilia A but not in severe hemophilia A as there are no stores to release. Repeated dosing of DDAVP results in tachyphylaxis. Oral antifibrinolytic drugs such as ε-aminocaproic acid (EACA) or tranexamic acid enhance local hemostasis.

1022 Laboratory test required to confirm presence of an inhibitor alloantibodies to FVIII is ?

Harrison's 18th Ed. 976

- A. PT mixed with normal plasma
- B. PT mixed with patients plasma
- C. aPTT mixed with normal plasma
- D. aPTT mixed with patients plasma

Laboratory test for confirming presence of an inhibitor is aPTT mixed with normal plasma. In hemophilia, a 1:1 mix with normal plasma corrects aPTT. In inhibitor patients, aPTT on a 1:1 mix is abnormally prolonged, as inhibitor neutralizes FVIII clotting activity of normal plasma.

1023 Alloantibody inhibitor formation to FVIII occurs after how many cumulative days of exposure ?

Harrison's 18th Ed. 976

- A. 10
- B. 20
- C. 30
- D. 40

Formation of alloantibodies to FVIII or FIX is a major complication of hemophilia treatment with a prevalence of 5-10%. Inhibitors appear early in life & after 10 cumulative days of exposure.

1024 Which of the following assay is used to define the specificity of the inhibitor and its titer ?

Harrison's 18th Ed. 976

- A. Minnesota assay
- B. Bethesda assay
- C. Glasgow assay
- D. Athens assay

Bethesda assay defines the specificity of the inhibitor and its titer. One Bethesda unit (BU) is the amount of antibody that neutralizes 50% of FVIII or FIX present in normal plasma after 2 hours of incubation at 37°C.

1025 Control of bleeding episodes in high-responder inhibitor patients can be achieved by ?*Harrison's 18th Ed. 976*

- A. Prothrombin complex concentrates (PCCs)
- B. Activated prothrombin complex concentrates (aPCCs)
- C. Recombinant activated Factor VII (FVIIa)
- D. All of the above

High-responder inhibitor patients are those with initial inhibitor titer of >10 BU & do not respond to FVIII or FIX concentrates. Control of bleeding is achieved by using concentrates enriched for prothrombin, FVII, FIX, FX (prothrombin complex concentrates), recombinant activated Factor VII.

1026 Which of the following is not effective for eradication of the inhibitory antibody in hemophiliacs ?*Harrison's 18th Ed. 976*

- A. Immunosuppression
- B. Immune tolerance induction (ITI)
- C. Anti-CD20 monoclonal antibody (rituximab)
- D. None of the above

For eradication of the inhibitory antibody, immunosuppression is not effective. Most effective strategy is immune tolerance induction (ITI). Addition of anti-CD20 monoclonal antibody (rituximab) as a coadjuvant to ITI is beneficial.

1027 Which of the following is the major cause of morbidity and second leading cause of death in hemophilia patients exposed to older clotting factor concentrates ?*Harrison's 18th Ed. 976*

- A. Hepatitis A virus
- B. Hepatitis B virus
- C. Hepatitis C virus
- D. Hepatitis E virus

Hepatitis C virus (HCV) infection is the major cause of morbidity and the second leading cause of death in hemophilia patients exposed to older clotting factor concentrates.

1028 Factor IX is activated to IXa by ?*Harrison's 18th Ed. 977*

- A. Factor IIa
- B. Factor Va
- C. Factor XIa
- D. Factor Xa

Factor XI is a zymogen of an active serine protease (FXIa) in the intrinsic pathway of blood coagulation that activates FIX to FIXa.

1029 Which of the following is false about Factor IX ?*Harrison's 18th Ed. 977*

- A. Synthesized in liver
- B. Requires vitamin K for biologic activity
- C. Factor IX gene is on X chromosome
- D. None of the above

1030 In liver, Vitamin K is converted into its active form called ?*Harrison's 18th Ed. 978*

- A. Hydroxide
- B. Sulphide
- C. Butyrate
- D. Epoxide

Following absorption, vitamin K is converted to an active epoxide in liver microsomes & serves as a cofactor in enzymatic carboxylation of glutamic acid residues on prothrombin complex proteins.

1031 Vitamin K deficiency is due to ?*Harrison's 16th Ed. 683*

- A. Inadequate dietary intake
- B. Intestinal malabsorption
- C. Loss of storage in liver
- D. All of the above

Three major causes of vitamin K deficiency are inadequate dietary intake, intestinal malabsorption, and loss of storage sites due to hepatocellular disease.

1032 Which of the following clotting factors has the shortest half-life ?*Harrison's 18th Ed. 980*

- A. Factor II
- B. Factor VII
- C. Factor IX
- D. Factor X

1033 Purpura fulminans is related best to ?*Harrison's 18th Ed. 979*

- A. Hemophilia
- B. Christmas disease
- C. Disseminated intravascular coagulation (DIC)
- D. Vitamin K deficiency

Purpura fulminans is a severe form of DIC resulting from thrombosis of extensive areas of skin following viral or bacterial infection, more in children. It is more common in those with inherited or acquired hypercoagulability due to deficiencies of components of protein C pathway.

1034 Which of the following is the mechanism of DIC ?*Harrison's 18th Ed. 979*

- A. Uncontrolled generation of thrombin
- B. Suppression of physiologic anticoagulant mechanisms
- C. Abnormal fibrinolysis
- D. All of the above

DIC is the result of uncontrolled generation of thrombin by exposure of blood to pathologic levels of tissue factor. Simultaneous suppression of physiologic anticoagulant mechanisms and abnormal fibrinolysis further accelerate the process. Together these abnormalities contribute to systemic fibrin deposition in small and mid-sized vessels.

1035 The most sensitive test for DIC is ?*Harrison's 18th Ed. 979*

- A. Prolongation of PT and/or aPTT
- B. Platelet counts <100,000/mm³
- C. Elevated levels of FDP
- D. Presence of schistocytes (fragmented red cells) in PBF

Findings in DIC include the prolongation of PT and/or aPTT, platelet counts <100,000/mm³, presence of schistocytes (fragmented RBCs) in PBF, and elevated levels of fibrin degradation products (FDPs). The most sensitive test for DIC is the FDP level. D-dimer test is more specific for detection of fibrin, but not fibrinogen degradation products.

1036 Chronic DIC can occur in ?*Harrison's 18th Ed. 979*

- A. Giant hemangioma
- B. Metastatic carcinoma
- C. Dead fetus syndrome
- D. All of the above

Low-grade, compensated DIC can occur in giant hemangioma, metastatic carcinoma, or the dead fetus syndrome.

1037 Findings evident in chronic DIC are all except ?*Harrison's 18th Ed. 979*

- A. Normal platelet count
- B. Normal aPTT
- C. Normal levels of plasma FDP or D-dimers
- D. Normal fibrinogen

In chronic compensated DIC, plasma levels of FDP or D-dimers are elevated. aPTT, PT, and fibrinogen values are within normal range or high. Normal platelet counts is a common finding.

1038 Which of the following is the first phase in DIC ?*Harrison's 16th Ed. 683*

- A. Thrombotic phase
- B. Procoagulant consumption phase
- C. Secondary fibrinolysis phase
- D. None of the above

The early thrombotic phase of DIC is followed by a phase of procoagulant consumption and secondary fibrinolysis.

1039 Laboratory findings in DIC include ?*Harrison's 16th Ed. 684*

- A. Thrombocytopenia
- B. Schistocytes
- C. Prolonged thrombin time
- D. All of the above

1040 Laboratory findings in DIC include ?*Harrison's 16th Ed. 684*

- A. Reduced fibrinogen level
- B. Elevated fibrin degradation products (FDP)
- C. Positive D dimer immunoassay
- D. All of the above

Laboratory features of DIC include thrombocytopenia, schistocytes or fragmented RBC's, prolonged PT, PTT & thrombin time, reduced fibrinogen level, elevated fibrin degradation products (FDP) and positive D dimer immunoassay.

1041 Which of the following predict more bleeding in DIC ?*Harrison's 16th Ed. 684*

- A. Thrombocytopenia
- B. Schistocytes
- C. Prolonged thrombin time
- D. Reduced fibrinogen level

Low fibrinogen levels in DIC predict more bleeding.

1042 Inhibitor of coagulation is ?*Harrison's 16th Ed. 684 Table 102-2*

- A. Antithrombin III
- B. Protein C
- C. Protein S
- D. All of the above

Coagulation inhibitors include protein C, protein S and antithrombin III.

1043 Which of the following has no role in the management of hemorrhagic symptoms of DIC ?*Harrison's 18th Ed. 980*

- A. FFP
- B. Cryoprecipitate

C. Clotting factor concentrates

D. Platelet concentrates

Clotting factor concentrates are not recommended for control of bleeding in DIC because of the limited efficacy afforded by replacement of single factors and high risk of products containing traces of activated blood proteases (PCCs), which further aggravates the disease.

1044 Low doses of continuous heparin infusion may be effective in patients with low-grade DIC due to ?*Harrison's 18th Ed. 980*

- A. Purpura fulminans
- B. During removal of a dead fetus
- C. During surgical resection of giant hemangiomas
- D. All of the above

Heparin is indicated for the treatment of purpura fulminans, during the surgical resection of giant hemangiomas, and during removal of a dead fetus.

1045 Laboratory findings in patients with liver disease include all except ?*Harrison's 18th Ed. 980*

- A. Prolonged PT
- B. Prolonged PTT
- C. Mild thrombocytopenia
- D. Low fibrinogen level

1046 Bleeding in liver disease is best managed with ?*Harrison's 18th Ed. 980*

- A. Fresh-frozen plasma
- B. Prothrombin complex concentrates
- C. Fibrinogen concentrates
- D. Anticoagulation with heparin

1047 Which of the following is false about 'Hyperhomocysteinemia' ?*Harrison's 17th Ed. 685*

- A. Predisposes to the risk of venous & arterial thromboembolism
- B. Congenital homocystinuria syndrome patients have Marfanoid habitus
- C. Vitamin B₁₂ deficiency produces high homocysteine levels
- D. None of the above

Chapter 117. **Arterial and Venous Thrombosis**

1048 Which of the following about platelets is false ?*Harrison's 18th Ed. 983*

- A. Disc-shaped
- B. Lack nucleus
- C. Average lifespan of 7 to 10 days
- D. None of the above

1049 Which of the following subendothelial components trigger platelet reactivity ?*Harrison's 18th Ed. 983*

- A. Vitronectin
- B. Fibronectin
- C. Thrombospondin

D. All of the above

Exposed subendothelial components that trigger platelet reactivity favouring adhesion include collagen, von Willebrand factor, fibronectin, vitronectin and thrombospondin.

1050 Which of the following expressed on platelet surface regulate collagen-induced platelet adhesion ?

Harrison's 18th Ed. 983

- A. GP IV
- B. GP VI
- C. Integrin $\alpha_2\beta_1$
- D. All of the above

Certain proteins are expressed on the platelet surface that regulate collagen-induced platelet adhesion. These include glycoprotein (GP) IV, GPIIb, and integrin $\alpha_2\beta_1$.

1051 Which of these is central to platelet adhesion and to the initiation of platelet activation ?

Harrison's 18th Ed. 983

- A. GPIIb-IX-VII
- B. GPIb-IX-VII
- C. GPIb-IX-V
- D. GPIIb-IX-V

The platelet GPIIb-IX-V complex adhesive receptor is central both to platelet adhesion and to the initiation of platelet activation. GPIIb-IX-V complex binds to the exposed von Willebrand factor, causing platelets to adhere. vWF-bound GPIIb-IX-V transforms the GPIIb/IIIa receptor from an inactive low-affinity state to an active high-affinity receptor for fibrinogen.

1052 P2X₁, P2Y₁, and P2Y₁₂ are which variety of receptors ?

Harrison's 18th Ed. 984

- A. ADP receptors
- B. Prostaglandin receptors
- C. Lipid receptors
- D. Chemokine receptors

Receptors found on platelets regulate their functions. They include the ADP receptors, prostaglandin receptors, lipid receptors, and chemokine receptors. ADP receptors are classified as P2X₁, P2Y₁, and P2Y₁₂. Activation of both P2Y₁₂ & P2Y₁ receptors is essential for ADP-induced platelet aggregation. Thienopyridine derivatives, clopidogrel & prasugrel, are clinically utilized inhibitors of ADP-induced platelet aggregation.

1053 P-selectin glycoprotein ligand 1 (PSGL-1) best relates with ?

Harrison's 18th Ed. 985

- A. Platelet surface receptor
- B. Leukocyte receptor
- C. Endothelial receptor
- D. All of the above

Activated platelets adhere to circulating leukocytes. Platelets bind via P-selectin (CD62P) expressed on the surface of activated platelets to the leukocyte receptor, P-selectin glycoprotein ligand 1 (PSGL-1). This association leads to increased expression of CD11b/CD18 (Mac-1) on leukocytes.

Chapter 118. Antiplatelet, Anticoagulant, and Fibrinolytic Drugs

1054 Circulating platelets are maintained in an inactive state by ?

Harrison's 18th Ed. 988

- A. Nitric oxide (NO)
- B. Prostacyclin
- C. CD39

D. All of the above

Circulating platelets are maintained in an inactive state by nitric oxide (NO) and prostacyclin released by endothelial cells lining the blood vessels. Endothelial cells also express CD39 on their surface, a membrane-associated ecto-adenosine diphosphatase (ADPase) that degrades ADP released from activated platelets.

1055 Thromboxane A2 (TxA2) plays a role in ?

Thrombosis Research 2007;120: 337-346

- A. Activating platelets
- B. Constricting blood vessels
- C. Promoting atherogenesis by inducing proliferation of vascular smooth muscle cells
- D. All of the above

1056 Which of the following statements is false ?

Lancet 2006; 367: 606-17

- A. NSAIDs (ibuprofen/diclofenac) are reversible inhibitors of COX
- B. In mature human platelets, COX-2 are absent
- C. Thromboxane A2 can be produced in monocytes and macrophages
- D. None of the above

1057 Which of the following drugs is used in arterial disease management ?

Harrison's 16th Ed. 687

- A. That inhibit platelet activation & aggregation
- B. That inhibit thrombin generation
- C. That inhibit fibrin generation
- D. All of the above

Drugs that inhibit platelet activation & aggregation play a primary role in arterial disease management while drugs that inhibit thrombin & fibrin generation play a primary role in venous disease.

1058 At what dose, aspirin also inhibits COX-2 ?

Harrison's 18th Ed. 989

- A. ~ 325 mg / day
- B. ~ 500 mg / day
- C. ~ 750 mg / day
- D. ~ 1000 mg / day

Aspirin produces its antithrombotic effect by irreversibly acetylating and inhibiting platelet cyclooxygenase COX-1. At high doses (~1000 mg/day), aspirin also inhibits COX-2.

1059 Aspirin can produce antithrombotic effect at a dose of ?

Harrison's 16th Ed. 687

- A. 20 mg/day
- B. 30 mg/day
- C. 40 mg/day
- D. 50 mg/day

1060 The major thrombin receptor on human platelets is ?

Harrison's 18th Ed. 989 Figure 118-3

- A. Glycoprotein (GP) IIb/IIIa
- B. Integrin $\alpha_2\beta_1$
- C. Protease-activated receptor-1 (PAR-1)
- D. GPIb-IX-V

Protease-activated receptor-1 (PAR-1) is the major thrombin receptor on human platelets.

1061 Compared with placebo, aspirin produces a reduction in the risk of cardiovascular death, MI, or stroke by ?

Harrison's 18th Ed. 989

- A. 5 %
- B. 15 %
- C. 25 %
- D. 35 %

Compared with placebo, aspirin led to a 25% reduction in risk of CV death, MI, or stroke.

1062 For most indications, recommended daily dose of aspirin is ?

Harrison's 18th Ed. 989

- A. 40 - 75 mg
- B. 75 - 100 mg
- C. 100 - 150 mg
- D. 150 - 300 mg

Daily aspirin doses of 75 - 100 mg are recommended for most indications.

1063 Ticlopidine, clopidogrel, and prasugrel irreversibly block which of the following ?

Harrison's 18th Ed. 989 Figure 118-3

- A. P2X₁₂
- B. P2Y₁₂
- C. P2X₂₁
- D. P2Y₂₁

Thienopyridines (Ticlopidine, clopidogrel, and prasugrel) irreversibly block P2Y₁₂, a key ADP receptor on the platelet surface. Cangrelor and ticagrelor are reversible inhibitors of P2Y₁₂.

1064 Which of the following is a prodrug ?

Harrison's 18th Ed. 990

- A. Ticlopidine
- B. Clopidogrel
- C. Prasugrel
- D. All of the above

1065 Compared with aspirin, clopidogrel produces a reduction in the risk of cardiovascular death, MI, or stroke by ?

Harrison's 18th Ed. 990

- A. 2.5 %
- B. 8.7 %
- C. 13.5 %
- D. 18.2 %

When compared with aspirin in patients with recent ischemic stroke, MI, or peripheral arterial disease, clopidogrel reduced the risk of cardiovascular death, MI, and stroke by 8.7%.

1066 Which of the following drugs is known to produce thrombotic thrombocytopenic purpura (TTP) ?

Harrison's 18th Ed. 990

- A. Ticlopidine
- B. Dipyridamole
- C. Tirofiban
- D. Aspirin

Side effects of ticlopidine are gastrointestinal and hematologic. Neutropenia, thrombocytopenia, and thrombotic thrombocytopenic purpura usually occur within the first few months of starting treatment. Clopidogrel rarely precipitates TTP.

1067 Which of the following represents the final common pathway of platelet activation ?

Harrison's 18th Ed. 989 Figure 118-3

- A. Cyclooxygenase (COX)
- B. Adenosine diphosphate (ADP) receptors
- C. Gp Ib
- D. Gp IIb/IIIa

Expression of functionally active GpIIb/IIIa on platelet surfaces is the final common pathway of platelet activation regardless of initial stimulus.

1068 Which drug was studied in the 'CAPRIE trial' ?

Harrison's 16th Ed. 688

- A. Aspirin
- B. Ticlopidine and clopidogrel
- C. Clopidogrel
- D. All of the above

Clopidogrel was compared to aspirin in CAPRIE trial for effect on ischemic events in patients with recent stroke or MI and in those with symptomatic peripheral arterial disease.

1069 The main metabolite of Clopidogrel is ?

Harrison's 16th Ed. 688

- A. SR 25334
- B. SR 26334
- C. SR 27334
- D. SR 28334

Clopidogrel inhibits ADP-induced platelet aggregation. Its main metabolite is SR 26334.

1070 Subjects with which of the following allele exhibit decreased responsiveness to clopidogrel ?

Harrison's 18th Ed. 991

- A. CYP2C17*2
- B. CYP2C18*2
- C. CYP2C19*2
- D. CYP2C20*2

*Subjects with loss-of-function CYP2C19*2 allele exhibit decreased responsiveness to clopidogrel.*

1071 Which of the following is a platelet membrane glycoprotein receptor ?

The Lancet 2000;355:1531

- A. Glycoprotein Ia-IIa
- B. Glycoprotein Ib-V-IX
- C. Glycoprotein IIb-IIIa
- D. All of the above

On platelets, Glycoprotein Ia-IIa is an active receptor for collagen, Glycoprotein Ib-V-IX is an active receptor for insoluble von Willebrand factor while the most abundant surface protein Glycoprotein IIb-IIIa requires conformational change during platelet activation to express receptor function, mainly for fibrinogen.

1072 Which of the following is a GPIIb/IIIa receptor antagonist ?

Harrison's 18th Ed. 991

- A. Abciximab
- B. Eptifibatide
- C. Tirofiban
- D. All of the above

Parenteral GPIIb/IIIa receptor antagonists are abciximab, eptifibatide, and tirofiban.

1073 Which of the following is false about GPIIb/IIIa adhesion receptors ?

Harrison's 18th Ed. 991, The Lancet 2000;355:1531

- A. Found on surface of platelets & megakaryocytes
- B. About 80,000 per platelet
- C. GPIIb/IIIa is inactive on resting platelets
- D. None of the above

Per platelet, the number of GP Ia-IIa receptors is 900–2300 molecules, GP Ib-V-IX receptors is 25000 molecules, GP IIb-IIIa receptors is 80000 molecules.

1074 Once activated, GPIIb/IIIa binds which of the following ?

Harrison's 18th Ed. 991

- A. Thrombin
- B. RBC
- C. Fibrinogen
- D. WBC

Once activated, GPIIb/IIIa binds fibrinogen. Also, it binds to von Willebrand factor, fibronectin, vitronectin and and thrombospondin.

1075 Deficiency of which of the following results in Glanzmann's thrombasthenia ?

The Lancet 2000;355:1533

- A. Glycoprotein IIb-IIIa
- B. Glycoprotein Ia-IIa
- C. Glycoprotein Ib-V-IX
- D. All of the above

Patients with Glanzmann's thrombasthenia have undetectable platelet glycoprotein IIb-IIIa.

1076 Which of the following target the GPIIb / IIIa receptor ?

Harrison's 18th Ed. 991

- A. Abciximab
- B. Eptifibatide
- C. Tirofiban
- D. All of the above

Abciximab, eptifibatide and tirofiban - all target the GPIIb/IIIa receptor.

1077 Which of the following is a Fab fragment of a humanized murine monoclonal antibody ?

Harrison's 18th Ed. 992

- A. Abciximab
- B. Eptifibatide
- C. Tirofiban
- D. All of the above

Abciximab is a Fab fragment of a humanized murine monoclonal antibody that binds to the activated GPIIb/IIIa receptor with high affinity and blocks the binding of adhesive molecules like fibrinogen.

1078 Which of the following GPIIb/IIIa antagonists are given as an IV bolus followed by an infusion ?

Harrison's 18th Ed. 992

- A. Abciximab
- B. Eptifibatide
- C. Tirofiban
- D. All of the above

All of the GPIIb/IIIa antagonists are given as an IV bolus followed by an infusion.

1079 Most serious complication of GPIIb/IIIa antagonist therapy is ?

Harrison's 18th Ed. 992

- A. Anemia
- B. Leucopenia
- C. Thrombocytopenia
- D. All of the above

Immune-mediated thrombocytopenia is the most serious complication of GPIIb/IIIa therapy.

1080 Which of the following can be administered orally ?

Harrison's 18th Ed. 992

- A. Heparin
- B. Low-molecular-weight heparin (LMWH)
- C. Dabigatran etexilate
- D. Fondaparinux

Parenteral anticoagulants include heparin, low-molecular-weight heparin (LMWH), and fondaparinux. Only available oral anticoagulant is warfarin. Dabigatran etexilate is an oral thrombin inhibitor, and rivaroxaban is an oral Factor Xa inhibitor.

1081 Commercial unfractionated heparin (UFH) is obtained from which of the following sources ?

Harrison's 16th Ed. 688

- A. Bovine lung
- B. Bovine intestinal mucosa
- C. Bovine liver
- D. Bovine bone marrow

Commercial UFH is obtained from bovine lung or porcine intestinal mucosa.

1082 Commercial unfractionated heparin (UFH) is obtained from which of the following sources ?

Harrison's 18th Ed. 992

- A. Porcine lung
- B. Porcine intestinal mucosa
- C. Porcine liver
- D. Porcine bone marrow

Heparin is a sulfated polysaccharide and is isolated from mammalian tissues rich in mast cells. Most commercial heparin is derived from porcine intestinal mucosa and is a polymer of alternating D-glucuronic acid and N-acetyl-d-glucosamine residues.

1083 Which unique sequence of UFH molecule binds to antithrombin ?

Harrison's 18th Ed. 992

- A. Pentasaccharide
- B. Hexasaccharide
- C. Heptasaccharide
- D. Decasaccharide

Heparin acts as an anticoagulant exclusively by activating antithrombin III. Presence of Antithrombin III is mandatory for its action. Heparin binds to Antithrombin III via a unique pentasaccharide sequence that is found on one-third of the chains of commercial heparin.

1084 Antithrombin is a member of ?

Harrison's 18th Ed. 992

- A. Ornithine protease inhibitor
- B. Cystine protease inhibitor
- C. Glycine protease inhibitor
- D. Serine protease inhibitor

Antithrombin is a plasma cofactor for heparin. It is a member of serine protease inhibitor (serpin) superfamily.

1085 Antithrombin is synthesized in ?*Harrison's 18th Ed. 992*

- A. Kidney
- B. Liver
- C. Intestinal mucosa
- D. Lung

Antithrombin is synthesized in liver and acts as a suicide substrate for its target enzymes.

1086 UFH-antithrombin complex inactivates which of the following ?*Harrison's 18th Ed. 992*

- A. Factor IX
- B. Factor X
- C. Factor Xa
- D. Factor II

Once bound to antithrombin III, heparin induces a conformational change in reactive center loop of antithrombin that makes it readily accessible to its target proteases. This conformational change enhances the rate at which antithrombin inhibits factor Xa by at least two orders of magnitude but has little effect on the rate of thrombin inhibition by antithrombin. To catalyze thrombin inhibition, heparin serves as a template that binds antithrombin & thrombin simultaneously. Formation of this ternary complex brings the enzyme in close apposition to the inhibitor, thereby promoting the formation of a stable covalent thrombin-antithrombin complex.

1087 For thrombin inhibition, heparin of what nature simultaneously binds to antithrombin and thrombin ?*Harrison's 18th Ed. 993*

- A. At least 16 saccharide units, molecular weight 5400
- B. At least 17 saccharide units, molecular weight 5400
- C. At least 18 saccharide units, molecular weight 5400
- D. At least 19 saccharide units, molecular weight 5400

For thrombin inhibition, heparin chain of at least 18 saccharide units (molecular weight 5400) simultaneously binds to antithrombin and thrombin.

1088 What is the mean molecular weight of heparin ?*Harrison's 18th Ed. 993*

- A. 15,000
- B. 20,000
- C. 25,000
- D. 30,000

Heparin has a mean molecular weight of 15,000.

1089 What is the mean molecular weight of LMWH ?*Harrison's 18th Ed. 993*

- A. 2500 - 4000
- B. 4500 - 5000
- C. 5000 - 6000
- D. 6000 - 7500

LMWH have a mean molecular weight of 4500 - 5000.

1090 Which of the following statements about tissue factor pathway inhibitor (TFPI) ?*Harrison's 18th Ed. 993*

- A. Derived from endothelium
- B. Factor Xa-dependent
- C. Contribute to antithrombotic activity of heparin
- D. None of the above

1091 In the circulation, heparin binds to ?*Harrison's 18th Ed. 993*

- A. Endothelium
- B. Macrophages
- C. Platelet factor 4 (PF4)
- D. All of the above

In the circulation, heparin binds to the endothelium, antithrombin, macrophages, acute-phase reactants, platelet factor 4 (PF4).

1092 Plasma half-life of heparin given as IV bolus (100 U/kg) is ?*Harrison's 18th Ed. 993*

- A. 60 minutes
- B. 120 minutes
- C. 180 minutes
- D. 240 minutes

Plasma half-life of heparin ranges from 30 - 60 minutes with bolus IV doses of 25 and 100 U/kg, respectively.

1093 Which of the following internalize & depolymerize long heparin chains & secrete shorter chains back into the circulation ?*Harrison's 18th Ed. 993*

- A. Endothelium
- B. Macrophages
- C. Platelets
- D. RBC's

Heparin binds to macrophages, which internalize and depolymerize the long heparin chains and secrete shorter chains back into the circulation.

1094 Heparin-binding domain in thrombin is ?*N Engl J Med 2005;353:1028-40, Harrison's 18th Ed. 997*

- A. Active site or catalytic site
- B. Exosite 1
- C. Exosite 2
- D. All of the above

Thrombin-inhibiting drugs can block the action of thrombin by binding to three domains: the active site or catalytic site and two exosites. Exosite 1 acts as a dock for substrates such as fibrin. Exosite 2 serves as the heparin-binding domain.

1095 Which of the following statements about heparin is false ?*Harrison's 18th Ed. 993*

- A. Heparin must be given parenterally
- B. Clearance is mainly renal
- C. Platelet factor 4 can neutralize anticoagulant activity of heparin
- D. Anti-factor Xa levels is used to monitor heparin therapy

Clearance of heparin is mainly extrarenal.

1096 For therapeutic anticoagulation, after IV bolus of 70 units/kg, heparin is infused at rate of ?*Harrison's 18th Ed. 994*

- A. 12 - 15 units/kg per hour
- B. 25 - 30 units/kg per hour
- C. 30 - 50 units/kg per hour
- D. 50 - 65 units/kg per hour

For therapeutic anticoagulation, after IV bolus of 70 units/kg, heparin is infused at rate of 12-15 units/kg per hour.

- 1097 One USP unit of heparin is defined as the concentration of heparin that prevents 1 mL of citrated sheep plasma from clotting for 1 hour after addition of ?**

Harrison's 18th Ed. 994

- A. Calcium
- B. Sodium
- C. Potassium
- D. Citrate

One USP unit of heparin is defined as the concentration of heparin that prevents 1 mL of citrated sheep plasma from clotting for 1 hour after addition of calcium.

- 1098 Which of the following is not a side effect of heparin ?**

Harrison's 18th Ed. 994

- A. Thrombocytopenia
- B. Osteoporosis
- C. Elevated levels of transaminases
- D. Leucopenia

The most common side effect of heparin is bleeding. Other complications include thrombocytopenia, osteoporosis, and elevated levels of transaminases.

- 1099 Protamine sulfate is isolated from ?**

Harrison's 18th Ed. 994

- A. Horse urine
- B. Horse serum
- C. Salmon sperm
- D. Bovine urine

Protamine sulfate, a mixture of basic polypeptides isolated from salmon sperm. Protamine binds heparin with high affinity, and the resultant protamine-heparin complexes are then cleared.

- 1100 1 mg of protamine sulfate neutralizes how many units of heparin ?**

Harrison's 18th Ed. 994

- A. 100
- B. 200
- C. 300
- D. 400

1 mg of protamine sulfate neutralizes 100 units of heparin.

- 1101 Mode of administration of protamine sulfate is ?**

Harrison's 18th Ed. 994

- A. S/C
- B. IM
- C. IV
- D. Any of the above

Protamine sulfate is given as a slow IV infusion. Anaphylactoid reactions can occur.

- 1102 "True" heparin resistance results from nonspecific heparin binding to ?**

Harrison's 16th Ed. 688

- A. White blood cells
- B. Vascular endothelial cells
- C. Acute-phase proteins
- D. All of the above

- 1103 "Apparent" heparin resistance is a result of elevation of which factor ?**

Harrison's 16th Ed. 688

- A. Factor II
- B. Factor VII
- C. Factor VIII
- D. Factor X

"True" heparin resistance results from nonspecific heparin binding to WBC, vascular endothelial cells & acute-phase proteins. Apparent heparin resistance is a result of raised factor VIII levels.

- 1104 Which of the following is a type of immunologic thrombocytopenia ?**

Harrison's 16th Ed. 674

- A. Viral or bacterial infections
- B. Heparin
- C. Idiopathic thrombocytopenic purpura (ITP)
- D. All of the above

- 1105 Which of the following is false about immunologic thrombocytopenia ?**

Harrison's 16th Ed. 674

- A. Platelets coated with immune complexes
- B. Usually no splenomegaly
- C. Increased number of bone marrow megakaryocytes
- D. None of the above

Most common causes of immunologic thrombocytopenia are viral or bacterial infections, drugs (heparin) and idiopathic thrombocytopenic purpura (ITP). Such patients usually do not have splenomegaly & show increased number of bone marrow megakaryocytes.

- 1106 "White clot syndrome" is also called ?**

Harrison's 16th Ed. 675

- A. Heparin-induced thrombosis
- B. Warfarin-induced thrombosis
- C. Phenytoin-induced thrombosis
- D. Thiazide-induced thrombosis

Heparin-induced thrombosis is also called "white clot syndrome".

- 1107 Mechanism of Heparin induced thrombocytopenia type I is ?**

Harrison's 16th Ed. 675

- A. Idiopathic
- B. Directly agglutinating platelets
- C. Heparin-PF-4 antibody complexes
- D. All of the above

- 1108 Mechanism of Heparin induced thrombocytopenia type II is ?**

Harrison's 16th Ed. 675

- A. Idiopathic
- B. Directly agglutinating platelets
- C. Heparin-PF-4 antibody complexes
- D. All of the above

In Type I HIT, thrombocytopenia is produced by directly agglutinating platelets. In type II HIT, an immune reaction causes thrombocytopenia. Offending antigen is a complex formed between heparin and platelet-derived heparin-neutralizing protein, platelet factor 4.

- 1109 Characteristic of Platelet factor 4 is ?**

Harrison's 16th Ed. 675

- A. Platelet-derived heparin-aggravating protein

- B. Platelet-derived heparin-neutralizing protein
- C. Platelet-derived heparin-activating protein
- D. Platelet-derived heparin-destroying protein

Platelet factor 4 is a heparin-neutralizing protein. Severe of Type II HIT is because heparin - PF-4 antibody complexes bind the platelet Fc receptor to induce platelet activation & secretion.

1110 Which of the following drugs does not cause thrombocytopenia ?

Harrison's 16th Ed. 675

- A. Unfractionated Heparin
- B. Sulfonamides
- C. Danazol
- D. Thiazide diuretics

1111 Which of the following best relates to Heparin-induced thrombocytopenia (HIT) ?

Harrison's 18th Ed. 994-995

- A. Antibodies of the IgM isotype
- B. Antibodies against neoantigens on PF4
- C. More common in medical than surgical patients
- D. More frequent in males than in females

HIT is an antibody-mediated process triggered by antibodies directed against neoantigens on PF4 that are exposed when heparin binds to this protein. These antibodies are of the IgG isotype and bind simultaneously to heparin-PF4 complex and to platelet Fc receptors. HIT is more common in surgical patients than in medical patients and, like many autoimmune disorders, occurs more frequently in females than in males.

1112 HIT occurs how many days after initiation of heparin therapy ?

Harrison's 18th Ed. 995

- A. 1 to 3 days
- B. 2 to 5 days
- C. 5 to 14 days
- D. 12 to 25 days

HIT occurs 5 to 14 days after initiation of heparin therapy.

1113 The most specific diagnostic test for diagnosis of HIT is ?

Harrison's 18th Ed. 995

- A. ELISA for antibodies against heparin-PF4 complexes
- B. Platelet activation assays
- C. Serotonin release assay
- D. None of the above

The diagnosis of HIT is established using enzyme-linked assays to detect antibodies against heparin-PF4 complexes or with platelet activation assays. But, the most specific diagnostic test is the serotonin release assay. This test is performed by quantifying serotonin release when washed platelets loaded with labeled serotonin are exposed to patient serum in the absence or presence of varying concentrations of heparin. If the patient serum contains the HIT antibody, heparin addition induces platelet activation and serotonin release.

1114 Which of the following drugs is useful in HIT ?

Harrison's 18th Ed. 995

- A. Lepirudin
- B. Bivalirudin
- C. Fondaparinux
- D. All of the above

Heparin must be stopped in suspected or documented HIT. Alternative anticoagulant to prevent or treat thrombosis is started like parenteral direct thrombin inhibitors (lepirudin, argatroban, or bivalirudin), or factor Xa inhibitors (fondaparinux).

1115 LMWH have a mean molecular mass of ?

Harrison's 18th Ed. 995

- A. ~5 saccharide units
- B. ~17 saccharide units
- C. ~30 saccharide units
- D. ~45 saccharide units

LMWH have a mean molecular weight of 5000 (~ 17 saccharide units)

1116 LMWHs have an anti-factor Xa:antithrombin activity ratio of ?

Harrison's 18th Ed. 996

- A. 0.2 : 1
- B. 0.5 : 1
- C. 1:1
- D. 2:1

LMWH accelerates factor Xa inhibition by antithrombin. It has little effect on thrombin inhibition. LMWH have anti-factor Xa to anti-factor IIa ratios ranging from 2:1 - 4:1.

1117 Plasma half-life of LMWH is ?

Harrison's 18th Ed. 996

- A. 4 hour
- B. 6 hour
- C. 8 hour
- D. 12 hour

LMWH has a plasma half-life of ~4 hours and is cleared almost exclusively by kidneys.

1118 Which of the following statements about LMWH is false ?

Harrison's 18th Ed. 996

- A. LMWH cannot be administered IV
- B. LMWH is prepared from unfractionated heparin
- C. LMWH is cleared by kidneys
- D. Resistance to LMWH is rare

Usually given SC, LMWH can be administered IV if a rapid anticoagulant response is needed.

1119 Coagulation monitoring with LMWH is done by ?

Harrison's 18th Ed. 996

- A. PT
- B. aPTT
- C. Anti-factor Xa levels
- D. Any of the above

In LMWH therapy, coagulation monitoring is done by anti-factor Xa levels because most LMWH preparations have little effect on aPTT.

1120 Range of therapeutic anti-factor Xa levels with LMWH is ?

Harrison's 18th Ed. 996

- A. 0.5 - 1.2 units/mL
- B. 1.5 - 2.2 units/mL
- C. 2.5 - 3.2 units/mL
- D. 3.5 - 4.2 units/mL

Therapeutic anti-factor Xa levels with LMWH range from 0.5 - 1.2 units/mL, 3-4 hours later.

1121 Peak anti-factor Xa levels required when LMWH is given in prophylactic doses is ?

Harrison's 18th Ed. 996

- A. 0.1 - 0.3 units/mL

- B. 0.2 - 0.5 units/mL
- C. 0.5 - 0.8 units/mL
- D. 0.8 - 1.0 units/mL

When LMWH is given in prophylaxis, peak anti-factor Xa levels of 0.2 - 0.5 units/mL are desirable.

1122 Indications for LMWH monitoring include ?

Harrison's 18th Ed. 996

- A. Renal insufficiency
- B. Obesity
- C. Pregnancy
- D. All of the above

Indications for LMWH monitoring include renal insufficiency, obesity, pregnancy (III trimester), mechanical heart valves, infants or children.

1123 In unstable angina, dose of LMWH is ?

Harrison's 18th Ed. 996

- A. 30 - 50 units/kg
- B. 50 - 80 units/kg
- C. 80 - 100 units/kg
- D. 100 - 120 units/kg

In unstable angina, LMWH is given SC, twice-daily, at a dose of 100 - 120 units/kg.

1124 Which of the following statements about LMWH is false ?

Harrison's 18th Ed. 996

- A. Major complication of LMWH is bleeding
- B. Protamine sulfate completely reverses anti-factor IIa activity of LMWH
- C. Patients at high risk for bleeding are more safely treated with continuous IV UFH than with SC LMWH
- D. None of the above

1125 Fondaparinux has a molecular weight of ?

Harrison's 18th Ed. 997

- A. 1728
- B. 2728
- C. 3728
- D. 4728

Fondaparinux has a molecular weight of 1728. Fondaparinux binds only to antithrombin and is too short to bridge thrombin to antithrombin. Consequently, fondaparinux catalyzes factor Xa inhibition by antithrombin and does not enhance the rate of thrombin inhibition.

1126 Which of the following about Fondaparinux is false ?

Harrison's 18th Ed. 997

- A. Bioavailability of SC Fondaparinux is 100%
- B. Plasma half-life of Fondaparinux is 17 hours
- C. Fondaparinux does not cause HIT
- D. None of the above

Fondaparinux does not cause HIT because it does not bind to PF4. Also, there is no cross-reactivity of fondaparinux with HIT antibodies, hence can be used for the treatment of HIT.

1127 Which of the following drugs used for thromboprophylaxis has longest duration of action ?

Harrison's 16th Ed. 689

- A. Fondaparinux
- B. Idraparinux

- C. Ximelagatran
- D. Argatroban

Idraparinux is a long-acting pentasaccharide with a half-life of 130 hours. This facilitates once-weekly dosing for primary and/or secondary prevention of thromboembolic events.

1128 Which of the following is a natural anticoagulant ?

N Engl J Med 2005;353:1028-40

- A. Tissue factor pathway inhibitor
- B. Protein C and S
- C. Antithrombin
- D. All of the above

Coagulation cascade is regulated by natural anticoagulants like tissue factor pathway inhibitor, protein C & protein S & antithrombin. They restrict formation of hemostatic plug to the site of injury.

1129 Which of the following "Direct Thrombin Inhibitors" is cleared by liver ?

Harrison's 18th Ed. 997, N Engl J Med 2005;353:1028-40

- A. Melagatran
- B. Argatroban
- C. Ximelagatran
- D. Recombinant Hirudins

Argatroban is predominantly cleared by hepatic metabolism and requires dose adjustments in patients with hepatic dysfunction. Rest of the above DTI's are cleared by kidney.

1130 Which of the following statements about Direct Thrombin Inhibitors is false ?

N Engl J Med 2005;353:1028-40

- A. Activity of DTIs is independent of antithrombin
- B. DTIs can bind to and inhibit the activity of soluble thrombin and also thrombin bound to fibrin
- C. DTIs also have an antiplatelet effect
- D. None of the above

1131 aPTT is used to monitor the anticoagulant effect of all except ?

Harrison's 18th Ed. 997

- A. Heparin
- B. Lepirudin
- C. Low-Molecular-Weight Heparin
- D. Argatroban

If monitoring is necessary in patients receiving LMWH, anti-factor Xa levels must be measured because most LMWH preparations have little effect on the aPTT.

1132 Warfarin was initially developed as a ?

Harrison's 18th Ed. 998

- A. Diuretic
- B. Antibiotic
- C. Sedative
- D. Rodenticide

Warfarin was initially developed as a rodenticide.

1133 Which of the following is a vitamin K - dependent coagulation protein ?

Harrison's 18th Ed. 998

- A. Factor VII
- B. Factor X

- C. Prothrombin
- D. All of the above

Warfarin interferes with the synthesis of the vitamin K-dependent clotting proteins like prothrombin (factor II) and factors VII, IX, and X. Synthesis of the vitamin K-dependent anticoagulant proteins, proteins C and S, is also reduced by vitamin K antagonists.

1134 Warfarin acts by inhibiting which of the following ?

Harrison's 18th Ed. 998

- A. Vitamin K epoxide reductase (VKOR)
- B. Vitamin K reductase
- C. Vitamin K carboxylase
- D. Vitamin K hydrolase

Warfarin is a water-soluble vitamin K antagonist. It inhibits vitamin K epoxide reductase (VKOR) thereby interfering with the synthesis of the vitamin K dependent clotting proteins (factor II, VII, IX, and X). Synthesis of vitamin K dependent anticoagulant proteins (proteins C & S) is also reduced by vitamin K antagonists..

1135 All of the vitamin K dependent clotting factors possess which amino acid residues at their N termini ?

Harrison's 18th Ed. 998

- A. Leucine
- B. Isoleucine
- C. Glutamic acid
- D. Tryptophan

All of the vitamin K-dependent clotting factors possess glutamic acid residues at their N termini.

1136 Warfarin is a racemic mixture of which of the following isomers ?

Harrison's 18th Ed. 998

- A. C and D
- B. M and N
- C. R and S
- D. X and Y

Warfarin is a racemic mixture of R and S isomers, more active being the S isomer. In liver, CYP2C9 mediates oxidative metabolism of S isomer.

1137 Antithrombotic effect of warfarin depends on reduction in the functional level of ?

Harrison's 18th Ed. 998

- A. Factor VIII
- B. Factor IX
- C. Factor X
- D. Factor XI

Antithrombotic effect of warfarin depends on reduction in functional levels of factor X & prothrombin.

1138 The half-life of warfarin in plasma is ?

Harrison's 18th Ed. 998

- A. ~ 12 hours
- B. ~ 24 hours
- C. ~ 36 hours
- D. ~ 60 hours

Racemic warfarin has a plasma half-life of 36 - 42 hours. >97% of circulating warfarin is bound to albumin so only a small fraction of unbound warfarin is biologically active.

1139 INR in patients with prosthetic mechanical heart valves should be ?

Harrison's 18th Ed. 999

- A. 1.5 to 2.0

- B. 2.0 to 3.0
- C. 2.5 to 3.5
- D. 3.5 to 4.0

For most indications, warfarin is administered in doses that produce a target INR of 2.0 - 3.0. For patients with mechanical heart valves, a target INR of 2.5 - 3.5 is recommended.

1140 In atrial fibrillation, the risk of cardioembolic stroke increases at what level of INR ?

Harrison's 18th Ed. 999

- A. < 1.7
- B. < 1.9
- C. < 2.1
- D. < 2.3

1141 In atrial fibrillation, the risk of bleeding increases at what level of INR ?

Harrison's 18th Ed. 999

- A. > 3.0
- B. > 3.5
- C. > 4.0
- D. > 4.5

In atrial fibrillation, there occurs an increased risk of cardioembolic stroke when the INR falls to <1.7 and an increase in bleeding with INR values >4.5.

1142 Initial treatment with warfarin is supported by concomitant administration of which of the following ?

Harrison's 18th Ed. 999

- A. Heparin
- B. LMWH
- C. Fondaparinux
- D. Any of the above

Initial treatment with warfarin is supported by concomitant administration of either heparin, LMWH or fondaparinux. A minimum 5 day course of parenteral anticoagulation is recommended.

1143 Which of the following statements about warfarin is false ?

Harrison's 18th Ed. 999, 1000

- A. Warfarin is usually started at a dose of 5-10 mg.
- B. Warfarin crosses the placenta
- C. Warfarin does not pass into the breast milk
- D. None of the above

1144 Patients on warfarin with serious bleeding are treated with ?

Harrison's 18th Ed. 1000

- A. IV Vitamin K infusion
- B. Fresh-frozen plasma
- C. Prothrombin complex concentrates
- D. Any of the above

Patients on warfarin with serious bleeding should be given 10 mg of vitamin K by slow IV infusion till INR is in normal range. Treatment with vitamin K should be supplemented with fresh-frozen plasma (FFP) as a source of the vitamin K dependent clotting proteins. For life-threatening bleeds, prothrombin complex concentrates can be used.

1145 Warfarin-induced skin necrosis occurs in which week of therapy ?

Harrison's 18th Ed. 1000

- A. First week

- B. Second week
- C. Third week
- D. Fourth week

Skin necrosis due to warfarin therapy is seen 2 - 5 days after initiation of therapy.

1146 Warfarin-induced skin necrosis is seen in patients with congenital or acquired deficiencies of ?

Harrison's 18th Ed. 1000

- A. Tissue factor pathway inhibitor
- B. Protein C or S
- C. Antithrombin
- D. All of the above

Warfarin-induced skin necrosis is seen in patients with congenital or acquired deficiencies of protein C or protein S.

1147 In pregnant women, risk of warfarin embryopathy is greatest in which trimester of pregnancy ?

Harrison's 18th Ed. 1000

- A. First
- B. Second
- C. Third
- D. Any of the above

Warfarin embryopathy consists of nasal hypoplasia and stippled epiphyses. Risk of embryopathy is highest if warfarin is given in the first trimester of pregnancy.

1148 CNS abnormalities can occur with exposure to coumarins during which trimester of pregnancy ?

Harrison's 18th Ed. 1000

- A. First
- B. Second
- C. Third
- D. Any of the above

CNS abnormalities can occur with exposure to coumarins at any time during pregnancy.

1149 For prevention or treatment of thrombosis, which of the following can be given during pregnancy ?

Harrison's 18th Ed. 1000

- A. Heparin
- B. LMWH
- C. Fondaparinux
- D. Any of the above

1150 "Purple-toe syndrome" is seen in patients receiving warfarin with ?

Harrison's 16th Ed. 690

- A. Atherosclerotic vascular disease
- B. Hypertension
- C. Diabetes mellitus
- D. Porphyria

"Purple-toe syndrome" presents with atheroembolic symptoms like ischemic (purple) toes, livedo reticularis, gangrene, abdominal pain, or symptoms of renal infarction. Skin biopsy reveals cholesterol emboli in the purple-toe syndrome.

1151 Warfarin embryopathy is due to effect of warfarin on which bone matrix protein ?

Harrison's 16th Ed. 690

- A. Osteocalcin
- B. Osteotensin
- C. Osteophysin
- D. Osteogenin

Osteocalcin is a vitamin K-dependent bone matrix protein.

1152 Which of the following is an oral anticoagulant ?

Harrison's 18th Ed. 1000

- A. Dabigatran etexilate
- B. Rivaroxaban
- C. Apixaban
- D. All of the above

Dabigatran etexilate is an oral thrombin inhibitor. Rivaroxaban and apixaban are oral factor Xa inhibitors.

1153 Recombinant derivative of recombinant tissue-type plasminogen activator (rt-PA) is ?

Harrison's 18th Ed. 1001

- A. Anistreplase
- B. Alteplase
- C. Tenecteplase
- D. Activase

Approved fibrinolytic agents are streptokinase, acylated plasminogen streptokinase activator complex (anistreplase), urokinase, recombinant tissue-type plasminogen activator (rt-PA), also known as alteplase or activase & two recombinant derivatives of rt-PA, tenecteplase & reteplase.

1154 Which of the following is a fibrin-specific plasminogen activators ?

Harrison's 18th Ed. 1001

- A. Streptokinase
- B. Alteplase
- C. Anistreplase
- D. Urokinase

Alteplase, tenecteplase and reteplase are fibrin-specific plasminogen activators while streptokinase, anistreplase and urokinase are nonspecific plasminogen activators.

1155 Which of the following is false about 'Streptokinase' ?

Harrison's 16th Ed. 690

- A. Obtained from cultures of b-hemolytic streptococci
- B. By itself, it has no plasminogen activator (PA) activity
- C. Not fibrin-selective
- D. None of the above

1156 Streptokinase binds to which of the following ?

Harrison's 18th Ed. 1001

- A. Plasmin
- B. Plasminogen
- C. Fibrin
- D. All of the above

Streptokinase is not an enzyme and does not directly convert plasminogen to plasmin. Instead, streptokinase forms a 1:1 stoichiometric complex with plasminogen. This complex induces a conformational change in plasminogen that exposes its active site which then converts additional plasminogen molecules to plasmin to induce a systemic lytic state.

1157 Which of the following is false about 'Streptokinase' ?

Harrison's 18th Ed. 1002

- A Acts only when complexed with plasminogen
- B Streptokinase has no affinity for fibrin
- C Antigenic and anaphylactogenic
- D None of the above

1158 Urokinase is derived from ?

Harrison's 18th Ed. 1002

- A Cultured fetal kidney cells
- B Horse's urine
- C Cow's urine
- D All of the above

Urokinase is a two-chain serine protease derived from cultured fetal kidney cells with a molecular weight of 34,000. Urokinase converts plasminogen to plasmin directly by cleaving the Arg560-Val561 bond.

1159 The half-life of Urokinase is ?

Harrison's 16th Ed. 690

- A ~ 5 minutes
- B ~ 10 minutes
- C ~ 15 minutes
- D ~ 20 minutes

Half-life of Urokinase is ~20 minutes.

1160 Half-life of tissue-type plasminogen activator (t-PA) is ?

Harrison's 16th Ed. 690

- A ~ 5 minutes
- B ~ 10 minutes
- C ~ 15 minutes
- D ~ 20 minutes

The half-life of t-PA is ~5 minutes.

1161 Which of the following is a direct fibrinolytic agent ?

Harrison's 18th Ed. 1003

- A Alfimeprase
- B Staphylokinase
- C TNK-rt-PA
- D Streptokinase

Alfimeprase is a metalloproteinase enzyme (isolated from venom of southern copperhead snake) that degrades fibrin & fibrinogen in a plasmin-independent fashion. In circulation, alfimeprase is inhibited by α_2 -macroglobulin. Alfimeprase must be delivered via a catheter directly into the thrombus.

1162 Risk of intracranial hemorrhage with use of thrombolytic agents is increased in all except ?

Harrison's 16th Ed. 690

- A Older age
- B Female sex
- C Higher body weight
- D Hypertension

1163 Which of the following is a "bolus fibrinolytic" agent ?

Harrison's 16th Ed. 1453

- A Tenecteplase (TNK)
- B Streptokinase
- C Urokinase
- D Tissue plasminogen activator

1164 Paget-Schroetter syndrome relates to ?

Lancet 2005; 365: 1163-74

- A Acute deep vein thrombosis in cancer patients
- B Deep vein thrombosis of arms
- C Deep vein thrombosis in pregnant women
- D Recurrent ipsilateral deep vein

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

ANSWERS HEMATOLOGY

1 B	50 D	99 D	148 B	197 C	246 D
2 D	51 B	100 A	149 D	198 C	247 D
3 C	52 A	101 A	150 D	199 A	248 D
4 B	53 A	102 A	151 D	200 B	249 A
5 A	54 D	103 B	152 D	201 D	250 A
6 D	55 C	104 D	153 B	202 D	251 D
7 D	56 C	105 D	154 D	203 D	252 D
8 C	57 D	106 D	155 C	204 D	253 D
9 B	58 D	107 C	156 B	205 D	254 B
10 C	59 A	108 D	157 D	206 C	255 B
11 C	60 D	109 D	158 C	207 B	256 D
12 A	61 D	110 B	159 B	208 B	257 B
13 D	62 D	111 B	160 B	209 D	258 A
14 A	63 A	112 D	161 D	210 B	259 D
15 A	64 A	113 C	162 D	211 C	260 C
16 C	65 D	114 A	163 D	212 B	261 A
17 C	66 C	115 B	164 D	213 A	262 D
18 C	67 C	116 C	165 D	214 A	263 A
19 B	68 B	117 A	166 B	215 B	264 B
20 B	69 C	118 C	167 D	216 D	265 D
21 D	70 D	119 A	168 C	217 D	266 D
22 A	71 B	120 D	169 D	218 B	267 C
23 A	72 A	121 A	170 C	219 D	268 B
24 B	73 D	122 B	171 D	220 C	269 D
25 A	74 D	123 D	172 B	221 A	270 B
26 D	75 B	124 B	173 D	222 D	271 D
27 A	76 D	125 D	174 D	223 D	272 C
28 A	77 A	126 D	175 D	224 C	273 D
29 B	78 B	127 C	176 D	225 C	274 A
30 A	79 D	128 A	177 B	226 D	275 B
31 B	80 B	129 C	178 C	227 A	276 C
32 B	81 D	130 B	179 B	228 D	277 B
33 B	82 C	131 C	180 B	229 D	278 C
34 C	83 A	132 D	181 D	230 D	279 C
35 A	84 B	133 A	182 D	231 D	280 D
36 D	85 B	134 C	183 C	232 B	281 D
37 B	86 D	135 B	184 A	233 A	282 B
38 B	87 B	136 C	185 D	234 D	283 C
39 C	88 C	137 D	186 A	235 A	284 A
40 D	89 D	138 D	187 D	236 D	285 D
41 D	90 D	139 D	188 D	237 A	286 B
42 A	91 D	140 C	189 A	238 A	287 A
43 D	92 D	141 B	190 A	239 D	288 C
44 D	93 D	142 D	191 A	240 C	289 A
45 B	94 D	143 C	192 B	241 D	290 A
46 C	95 A	144 C	193 A	242 D	291 C
47 C	96 D	145 B	194 A	243 D	292 B
48 C	97 D	146 A	195 B	244 D	293 B
49 B	98 C	147 D	196 B	245 C	294 A

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295 D	344 C	393 A	442 A	491 D	540 D
296 D	345 A	394 A	443 D	492 C	541 C
297 D	346 A	395 A	444 D	493 D	542 D
298 D	347 D	396 D	445 D	494 B	543 D
299 A	348 D	397 C	446 D	495 C	544 D
300 A	349 D	398 D	447 B	496 D	545 A
301 D	350 D	399 D	448 D	497 D	546 B
302 C	351 C	400 C	449 B	498 C	547 D
303 D	352 D	401 A	450 C	499 B	548 C
304 D	353 B	402 C	451 B	500 D	549 A
305 D	354 D	403 A	452 C	501 A	550 A
306 C	355 C	404 D	453 A	502 B	551 D
307 C	356 C	405 D	454 A	503 D	552 A
308 D	357 A	406 A	455 A	504 C	553 B
309 D	358 D	407 B	456 D	505 B	554 D
310 B	359 D	408 D	457 B	506 D	555 D
311 D	360 D	409 A	458 C	507 B	556 B
312 A	361 B	410 D	459 A	508 C	557 B
313 B	362 A	411 D	460 B	509 B	558 C
314 C	363 D	412 D	461 D	510 D	559 B
315 D	364 C	413 C	462 A	511 C	560 B
316 D	365 A	414 A	463 A	512 D	561 C
317 A	366 A	415 D	464 D	513 A	562 A
318 D	367 C	416 A	465 D	514 A	563 B
319 D	368 D	417 D	466 A	515 C	564 D
320 B	369 C	418 C	467 B	516 B	565 B
321 B	370 B	419 A	468 A	517 B	566 D
322 A	371 B	420 A	469 A	518 D	567 D
323 C	372 A	421 D	470 B	519 D	568 D
324 D	373 C	422 D	471 C	520 A	569 B
325 B	374 B	423 D	472 D	521 D	570 D
326 D	375 C	424 C	473 A	522 D	571 D
327 A	376 C	425 A	474 D	523 D	572 C
328 B	377 A	426 B	475 D	524 B	573 C
329 D	378 A	427 D	476 A	525 B	574 B
330 D	379 C	428 D	477 B	526 D	575 D
331 D	380 A	429 D	478 A	527 D	576 D
332 D	381 B	430 D	479 D	528 A	577 D
333 C	382 D	431 C	480 D	529 D	578 D
334 B	383 B	432 D	481 C	530 D	579 A
335 D	384 B	433 D	482 D	531 C	580 B
336 D	385 C	434 D	483 A	532 B	581 A
337 B	386 A	435 D	484 B	533 B	582 A
338 C	387 A	436 B	485 C	534 D	583 C
339 A	388 A	437 B	486 D	535 A	584 B
340 B	389 A	438 C	487 A	536 D	585 B
341 D	390 C	439 B	488 C	537 A	586 D
342 C	391 B	440 A	489 D	538 D	587 C
343 A	392 A	441 D	490 C	539 D	588 D

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589 D	638 D	687 A	736 D	785 D	834 A
590 D	639 A	688 D	737 B	786 C	835 D
591 D	640 B	689 D	738 D	787 B	836 A
592 D	641 C	690 D	739 D	788 B	837 B
593 D	642 D	691 A	740 B	789 D	838 D
594 D	643 C	692 D	741 C	790 C	839 B
595 D	644 C	693 D	742 D	791 A	840 B
596 C	645 D	694 A	743 D	792 D	841 D
597 B	646 D	695 D	744 D	793 D	842 B
598 D	647 A	696 D	745 B	794 D	843 C
599 D	648 B	697 C	746 D	795 D	844 C
600 B	649 D	698 B	747 D	796 D	845 D
601 D	650 B	699 D	748 B	797 A	846 C
602 C	651 D	700 C	749 D	798 D	847 C
603 A	652 D	701 D	750 B	799 B	848 D
604 D	653 D	702 D	751 B	800 B	849 C
605 A	654 D	703 D	752 D	801 C	850 C
606 A	655 B	704 B	753 B	802 D	851 B
607 D	656 C	705 A	754 D	803 B	852 A
608 D	657 B	706 D	755 D	804 C	853 B
609 D	658 A	707 D	756 D	805 D	854 D
610 D	659 A	708 D	757 D	806 D	855 B
611 B	660 D	709 D	758 D	807 B	856 D
612 D	661 A	710 D	759 D	808 A	857 D
613 A	662 B	711 A	760 C	809 B	858 A
614 D	663 A	712 D	761 D	810 A	859 C
615 A	664 B	713 A	762 D	811 B	860 A
616 A	665 B	714 D	763 B	812 A	861 C
617 C	666 D	715 D	764 C	813 B	862 D
618 D	667 A	716 D	765 A	814 D	863 D
619 D	668 C	717 D	766 D	815 D	864 A
620 D	669 D	718 A	767 D	816 D	865 C
621 D	670 D	719 C	768 C	817 D	866 D
622 D	671 D	720 D	769 D	818 A	867 D
623 D	672 A	721 B	770 A	819 B	868 A
624 C	673 A	722 A	771 C	820 A	869 B
625 C	674 C	723 C	772 A	821 A	870 D
626 A	675 D	724 C	773 C	822 A	871 A
627 C	676 C	725 C	774 B	823 A	872 C
628 D	677 C	726 D	775 D	824 A	873 D
629 D	678 C	727 D	776 D	825 B	874 A
630 C	679 A	728 D	777 A	826 D	875 D
631 D	680 D	729 D	778 A	827 C	876 D
632 B	681 D	730 C	779 A	828 D	877 A
633 D	682 A	731 D	780 D	829 A	878 B
634 C	683 D	732 A	781 A	830 D	879 C
635 D	684 A	733 A	782 D	831 C	880 D
636 C	685 C	734 D	783 D	832 D	881 B
637 A	686 D	735 D	784 D	833 C	882 A

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883 C	932 B	981 B	1030 D	1079 C	1128 D
884 A	933 A	982 C	1031 D	1080 C	1129 B
885 D	934 D	983 D	1032 B	1081 A	1130 D
886 D	935 A	984 A	1033 C	1082 B	1131 C
887 B	936 A	985 A	1034 D	1083 A	1132 D
888 A	937 C	986 C	1035 C	1084 D	1133 D
889 C	938 A	987 A	1036 D	1085 B	1134 A
890 A	939 D	988 D	1037 C	1086 C	1135 C
891 D	940 D	989 A	1038 A	1087 C	1136 C
892 C	941 D	990 A	1039 D	1088 A	1137 C
893 B	942 C	991 A	1040 D	1089 B	1138 C
894 D	943 B	992 D	1041 D	1090 D	1139 C
895 C	944 D	993 D	1042 D	1091 D	1140 A
896 D	945 D	994 D	1043 C	1092 A	1141 D
897 C	946 A	995 D	1044 D	1093 B	1142 D
898 D	947 D	996 D	1045 D	1094 C	1143 D
899 C	948 B	997 A	1046 A	1095 B	1144 D
900 B	949 A	998 A	1047 D	1096 A	1145 A
901 D	950 C	999 A	1048 D	1097 A	1146 B
902 D	951 D	1000 C	1049 D	1098 D	1147 A
903 D	952 A	1001 C	1050 D	1099 C	1148 D
904 A	953 A	1002 D	1051 C	1100 A	1149 D
905 A	954 C	1003 D	1052 A	1101 C	1150 A
906 A	955 A	1004 D	1053 B	1102 D	1151 A
907 B	956 D	1005 D	1054 D	1103 C	1152 D
908 D	957 B	1006 D	1055 D	1104 D	1153 C
909 D	958 A	1007 D	1056 D	1105 D	1154 B
910 D	959 C	1008 D	1057 A	1106 A	1155 D
911 B	960 B	1009 C	1058 D	1107 B	1156 B
912 C	961 D	1010 A	1059 B	1108 C	1157 D
913 B	962 D	1011 A	1060 C	1109 B	1158 A
914 C	963 C	1012 A	1061 C	1110 C	1159 D
915 B	964 A	1013 C	1062 B	1111 B	1160 A
916 B	965 D	1014 D	1063 B	1112 C	1161 A
917 D	966 D	1015 A	1064 D	1113 C	1162 C
918 B	967 D	1016 A	1065 B	1114 D	1163 A
919 D	968 D	1017 C	1066 A	1115 B	1164 B
920 D	969 D	1018 A	1067 D	1116 D	
921 A	970 A	1019 D	1068 C	1117 A	
922 D	971 B	1020 D	1069 B	1118 A	
923 C	972 C	1021 D	1070 C	1119 C	
924 D	973 C	1022 C	1071 D	1120 A	
925 D	974 B	1023 A	1072 D	1121 B	
926 D	975 B	1024 B	1073 D	1122 D	
927 C	976 A	1025 D	1074 C	1123 D	
928 D	977 B	1026 A	1075 A	1124 D	
929 D	978 A	1027 C	1076 D	1125 A	
930 D	979 A	1028 C	1077 A	1126 D	
931 D	980 C	1029 D	1078 D	1127 B	

1 Which of the following features of breathing define dyspnea ?*Harrison's 16th Ed. 201*

- A. Abnormal
- B. Uncomfortable
- C. Awareness
- D. All of the above

Normally, at rest, one is unaware of the act of breathing. With exercise, though aware of breathing, discomfort is expected to be transient. Dyspnea is defined with prefixes before awareness of breathing i.e. abnormally uncomfortable.

2 Sudden and unexpected dyspneic episodes at rest can be associated with all except ?*Harrison's 16th Ed. 201*

- A. Pulmonary emboli
- B. Spontaneous pneumothorax
- C. Metabolic acidemia
- D. Anxiety

Laboured breathing is not synonymous with dyspnea. Hyperventilation with metabolic acidemia is rarely accompanied by dyspnea. Sudden & unexpected dyspnea at rest occur with pulmonary emboli, spontaneous pneumothorax, hypercapnea secondary to breath holding, or anxiety.

3 Which of the following is most characteristic of severe paroxysmal dyspnea of left ventricular failure ?*Harrison's 16th Ed. 201*

- A. Nocturnal episodes
- B. Sudden and unexpected
- C. Orthopnea
- D. All of the above

Nocturnal episodes of dyspnea are a typical feature of left ventricular failure. Sudden & unexpected dyspneic episodes at rest is more typical of pulmonary embolization, spontaneous pneumothorax, anxiety. Orthopnea is characteristic of congestive heart failure.

4 Orthopnea is seen in ?*Harrison's 16th Ed. 201*

- A. Congestive heart failure
- B. Asthma & COPD
- C. Bilateral diaphragmatic paralysis
- D. All of the above

Dyspnea occurring in supine posture is termed orthopnea. It points to the diagnosis of CHF, asthma, COPD, or bilateral diaphragmatic paralysis.

5 Platypnea is dyspnea that occurs in which position ?*Harrison's 16th Ed. 201*

- A. Upright
- B. Sitting
- C. Supine
- D. Lateral

Platypnea is dyspnea that occurs only in upright position.

6 Trepopnea most often occurs in patients with ?*Harrison's 16th Ed. 201*

- A. Asthma
- B. COPD
- C. Heart disease
- D. Pleural effusion

Trepopnea is dyspnea that occurs only in a lateral decubitus position, most often in patients with heart disease due to positional alterations in ventilation-perfusion relationships.

7 The sense of air hunger arises from ?*Harrison's 16th Ed. 202*

- A. Increased respiratory activity in brainstem
- B. Stimulation of vagal-irritant receptors
- C. Chemoreceptors in aortic and carotid bodies
- D. Afferent fibers in the phrenic nerves

8 The sensation of chest tightness probably results from ?*Harrison's 16th Ed. 202*

- A. Increased respiratory activity in brainstem
- B. Stimulation of vagal-irritant receptors
- C. Chemoreceptors in aortic and carotid bodies
- D. Afferent fibers in the phrenic nerves

Dyspnea is characterized by an excessive or abnormal activation of respiratory centers in brainstem. This stimuli may come from intrathoracic receptors via vagal nerves, afferent somatic nerves from respiratory muscles & chest wall, chemoreceptors in brain, aortic & carotid bodies, cortical centers or afferent fibers in phrenic nerves. Sense of air hunger arises from increased respiratory activity within brainstem & sensation of chest tightness results from stimulation of vagal-irritant receptors.

9 In chronic bronchitis, which of the following is the predominant sensory experience ?*Harrison's 16th Ed. 202*

- A. Inability to take in a sufficiently deep breath
- B. Difficulty in exhaling
- C. Difficulty in inhaling and exhaling
- D. Any of the above

Despite the fact that severe limitation of expiratory flow & hyperinflation of lung are characteristic of chronic bronchitis, sensory experience is often that of an inability to take in a sufficiently deep breath rather than difficulty in exhaling.

10 Obstruction of airways is an invariable finding in ?*Harrison's 16th Ed. 202*

- A. Asthma
- B. Chronic bronchitis
- C. Emphysema
- D. All of the above

Emphysema is a parenchymal disease, it is invariably accompanied by obstruction of airways.

11 Chronic cor pulmonale & respiratory failure is more common in which of the following diseases ?*Harrison's 16th Ed. 203*

- A. Severe kyphoscoliosis
- B. Pectus excavatum
- C. Ankylosing spondylitis
- D. Rheumatoid arthritis

Severe kyphoscoliosis alters ventilation to produce chronic cor pulmonale & respiratory failure.

12 J (juxtacapillary) receptors are found in ?*Harrison's 16th Ed. 203*

- A. Bronchi
- B. Terminal bronchiole
- C. Alveolar interstitial space
- D. All of the above

13 Which of the following is called "cardiac asthma" ?*Harrison's 16th Ed. 203*

- A. Paroxysmal nocturnal dyspnea (PND)

- B. Orthopnea
- C. Platypnea
- D. Trepopnea

PND is also called cardiac asthma. During night, with recumbency, total blood volume is increased due to fluid mobilization from edematous areas leading to pulmonary congestion.

14 “Nocturnal dyspnea” is a feature of which of the following ?

Harrison's 16th Ed. 203

- A. Heart failure
- B. Chronic bronchitis
- C. Asthma
- D. All of the above

Chronic bronchitis causes nocturnal dyspnea due to bronchial mucus hypersecretion leading to airway obstruction. It is relieved by cough & expectoration. Circadian variations increase bronchial sensitivity between 2 AM & 4 AM in asthma patients leading to episodes of nocturnal dyspnea.

15 Echocardiographically, which of the following is not a feature of left ventricular failure ?

Harrison's 16th Ed. 203

- A. Left atrial dilatation
- B. Left ventricular hypertrophy
- C. Reduced left ventricular ejection fraction
- D. Reduced right ventricular ejection fraction

Left atrial &/or left ventricular dilatation, LVH, reduced LV ejection fraction & disorders of LV wall motion are clues to a left ventricular cardiac etiology. Right ventricular ejection fraction may be low at rest or may decline during exercise in patients with severe lung disease.

16 In neurocirculatory asthenia, the electrocardiographic changes are most often seen during ?

Harrison's 16th Ed. 203

- A. Depolarization
- B. Repolarization
- C. Depolarization + Repolarization
- D. Any of the above

In neurocirculatory asthenia, ECG changes are most often seen during repolarization.

17 Frequent sighing respirations & irregular breathing pattern suggest which cause of dyspnea ?

Harrison's 16th Ed. 203

- A. Psychogenic
- B. Cardiac
- C. Pulmonary
- D. Diseases of chest wall or respiratory muscles

Frequent sighing respirations & irregular breathing point to a psychogenic origin of dyspnea.

18 Pulmonary edema due to “imbalance of Starling forces” includes all of the following except ?

Harrison's 16th Ed. 204

- A. Increased pulmonary capillary pressure
- B. Decreased plasma oncotic pressure
- C. Endogenous vasoactive substances
- D. Increased negativity of interstitial pressure

Imbalance of Starling forces leading to pulmonary edema can be produced by increased pulmonary capillary pressure, decreased plasma oncotic pressure or by increased negativity of interstitial pressure. Endogenous vasoactive substances (histamine, kinins) alter alveolar-capillary membrane permeability (acute respiratory distress syndrome).

19 Which of the following is termed “overperfusion pulmonary edema” ?

Harrison's 16th Ed. 204

- A. Increased pulmonary venous pressure without LVF
- B. Increased pulmonary venous pressure secondary to LVF
- C. Increased pulmonary capillary pressure secondary to increased pulmonary arterial pressure
- D. All of the above

Increased pulmonary capillary pressure secondary to increased pulmonary arterial pressure is called overperfusion pulmonary edema.

20 High-altitude pulmonary edema (HAPE) is more common in persons of which age ?

Harrison's 16th Ed. 205

- A. Infants
- B. < 25 years
- C. 30 to 60 years
- D. > 75 years

Exposure to high altitude in association with severe physical exertion causes pulmonary edema in healthy unacclimatized persons. It is common in persons under the age of 25 years.

21 Which of the following diffuse pulmonary edema does not have a hemodynamic origin ?

Harrison's 16th Ed. 205

- A. Shock due to sepsis
- B. Shock due to hemorrhagic pancreatitis
- C. Shock following cardiopulmonary bypass
- D. All of the above

Toxic insult to lungs, diffuse pulmonary infections, aspiration & shock, particularly due to sepsis, hemorrhagic pancreatitis & following cardiopulmonary bypass, are associated with diffuse pulmonary edema that clearly does not have a hemodynamic origin.

22 Prophylactic inhalation of which of the following reduces the incidence of high-altitude pulmonary edema (HAPE) ?

Harrison's 16th Ed. 205

- A. β_2 agonist salmeterol
- B. Steroid
- C. Ipratropium bromide
- D. Chromolyn

Prophylactic inhalation of β_2 agonist salmeterol, administration of oxygen and/or return to lower altitudes reduces the incidence of high-altitude pulmonary edema (HAPE).

23 Neurogenic pulmonary edema has been described in ?

Harrison's 16th Ed. 205

- A. Central nervous system disorders
- B. Peripheral nervous system disorders
- C. Central + peripheral nervous system disorders
- D. Any of the above

Neurogenic pulmonary edema has been described in patients with CNS disorders and without apparent preexisting left ventricular dysfunction.

24 Overdoses of which of the following heroin preparations is associated with pulmonary edema ?

Harrison's 16th Ed. 205

- A. Morphine
- B. Methadone
- C. Dextropropoxyphene

- D. All of the above

Parenteral & oral overdoses of legitimate preparations of morphine, methadone and dextropropoxyphene can produce pulmonary edema.

25 Which of the following leads to the development of interstitial edema ?

Harrison's 16th Ed. 205

- A. Rapid evacuation of a large pneumothorax
B. Acute severe asthma
C. Lymphangitic carcinomatosis
D. All of the above

Rapid evacuation of a large pneumothorax causes increased negativity of interstitial pressure. Large negative intrapleural pressures during acute severe asthma may cause interstitial edema. Lymphatic blockade due to lymphangitic carcinomatosis may lead to interstitial edema.

Hypoxia and Cyanosis

26 Pasteur's effect relates to ?

Harrison's 18th Ed. 287

- A. Switch from aerobic to anaerobic metabolism
B. Abnormal hemoglobin derivative
C. Pulmonary arteriovenous fistulae
D. Flow rate in vessels

Pasteur's effect refers to switch from aerobic to anaerobic metabolism.

27 Which of the following gene is upregulated in adaptation to hypoxia ?

Harrison's 18th Ed. 287

- A. Phosphoglycerate kinase
B. Phosphofructokinase
C. Glucose transporters Glut-1 and Glut-2
D. All of the above

Adaptations to hypoxia are mediated by upregulation of genes encoding glycolytic enzymes like phosphoglycerate kinase & phosphofructokinase & glucose transporters Glut-1 & Glut-2, and by growth factors like vascular endothelial growth factor (VEGF) & erythropoietin (EPO).

28 During hypoxia systemic arterioles dilate by opening of ?

Harrison's 18th Ed. 287

- A. Na_{ATP} channels in vascular smooth-muscle cells
B. K_{ATP} channels in vascular smooth-muscle cells
C. Cl_{ATP} channels in vascular smooth-muscle cells
D. All of the above

In hypoxia systemic arterioles dilate by opening of K_{ATP} channels in vascular smooth-muscle cells.

29 During hypoxia, pulmonary vascular smooth-muscle cells contract due to inhibition of ?

Harrison's 18th Ed. 287

- A. Na^+ channels
B. K^+ channels
C. Cl^- channels
D. All of the above

In pulmonary vascular smooth-muscle cells, inhibition of K^+ channels causes causing contraction.

30 Acute hypoxia causes a clinical picture resembling ?

Harrison's 18th Ed. 287

- A. Partial seizure
B. Peripheral neuropathy
C. Acute alcoholism
D. Migraine

Clinically, acute hypoxia resembles acute alcoholism (impaired judgment, motor incoordination).

31 In severe hypoxia, death usually results from ?

Harrison's 18th Ed. 287

- A. Respiratory failure
B. Cardiac arrhythmia
C. Seizure
D. Autonomic failure

In severe hypoxia, centers of brainstem are affected & death results from respiratory failure.

32 When hypoxia occurs consequent to respiratory failure, hemoglobin-oxygen dissociation curve is displaced to ?

Harrison's 18th Ed. 287

- A. Right
B. Left
C. Center
D. Any of the above

When hypoxia occurs due to respiratory failure, PaO_2 declines, PaCO_2 rises & Hb- O_2 dissociation curve is displaced to right, with greater quantities of O_2 released at any level of tissue PO_2 .

33 Most common cause of respiratory hypoxia is ?

Harrison's 18th Ed. 287

- A. Hypoventilation
B. Ventilation-perfusion mismatch
C. Intrapulmonary right-to-left shunting
D. None of the above

Most common cause of respiratory hypoxia is ventilation-perfusion mismatch.

34 Cyanosis occurs upon ascent to an altitude of ?

Harrison's 18th Ed. 287

- A. 2000 meters
B. 3000 meters
C. 4000 meters
D. 5000 meters

Cyanosis is manifest in an ascent to 4000 m (13,000 ft). At this height, FIO_2 & alveolar PO_2 are about 85 & 50 mmHg, respectively & SaO_2 is ~75% leaving more reduced Hb in arterial blood.

35 In which of the following conditions, PaO_2 cannot be restored to normal with inspiration of 100% O_2 ?

Harrison's 18th Ed. 287

- A. Tetralogy of Fallot (TOF)
B. Transposition of great arteries (TGA)
C. Eisenmenger's syndrome
D. All of the above

Hypoxia due to congenital cardiac malformations (TOF, TGA & Eisenmenger's syndrome) resembles intrapulmonary right-to-left shunting & PaO_2 cannot be restored to normal with 100% O_2 .

36 In anemic hypoxia, the PaO₂ is ?*Harrison's 18th Ed. 287*

- A. Normal
- B. Decreased
- C. Increased
- D. Any of the above

In anemic hypoxia, PaO₂ is normal but due to reduction of Hb concentration, absolute quantity of O₂ transported per unit volume of blood is diminished.

37 In which of the following hypoxia's, venous blood tends to have a high O₂ ?*Harrison's 18th Ed. 288*

- A. Exercise induced
- B. Circulatory hypoxia
- C. Cyanide poisoning
- D. Carbon monoxide intoxication

38 Example of "Histotoxic hypoxia" is ?*Harrison's 18th Ed. 288*

- A. Severe exercise
- B. Cyanide poisoning
- C. Raynaud's phenomenon
- D. High altitude hypoxia

Cyanide causes cellular hypoxia because tissues are unable to utilize O₂. As a result, venous blood tends to have a high O₂ tension. This condition is called histotoxic hypoxia.

39 Cyanosis is apparent when the mean capillary concentration of reduced hemoglobin exceeds ?*Harrison's 18th Ed. 288*

- A. 2 gram / dL
- B. 3 gram / dL
- C. 4 gram / dL
- D. 5 gram / dL

It is the absolute rather than relative quantity of reduced Hb that produces cyanosis. As concentration of total Hb is markedly reduced in severe anemia, absolute quantity of reduced Hb is still small and patients may not become cyanotic even with marked arterial desaturation.

40 Cyanosis can be observed in all except ?*Harrison's 18th Ed. 288*

- A. Marked polycythemia
- B. Carboxyhemoglobin (COHb)
- C. Methemoglobin
- D. Sulfhemoglobin

Patients with marked polycythemia become cyanotic at higher levels of SaO₂ than patients with normal hematocrit values. Cyanosis is also observed when nonfunctional hemoglobin (methemoglobin or sulfhemoglobin) is present in blood.

41 Most common congenital cardiac lesion associated with cyanosis in adult is ?*Harrison's 16th Ed. 211*

- A. Tetralogy of Fallot
- B. Patent ductus arteriosus
- C. Ventricular septal defect
- D. Atrial septal defect

Most common congenital cardiac lesion with cyanosis in the adult is tetralogy of Fallot.

42 Differential cyanosis is a feature of ?*Harrison's 17th Ed. 230*

- A. Tetralogy of Fallot
- B. Patent ductus arteriosus
- C. Ventricular septal defect
- D. Atrial septal defect

In patent ductus arteriosus, pulmonary hypertension and right-to-left shunt, differential cyanosis results, that is, cyanosis occurs in the lower but not in the upper extremities.

43 Which of the following is suspected when blood remains brown after mixing in test tube & exposed to air ?*Harrison's 16th Ed. 211*

- A. Marked polycythemia
- B. Carboxyhemoglobin (COHb)
- C. Methemoglobin
- D. Sulfhemoglobin

Diagnosis of methemoglobinemia is suspected if blood remains brown after mixing in a test tube & exposure to air. Spectroscopy confirms the diagnosis.

44 Which of the following is false in Eisenmenger syndrome ?*Harrison's 18th Ed. 287*

- A. Cyanosis
- B. Elevated pulmonary vascular resistance
- C. Intracardiac communication
- D. Pulmonic stenosis

Elevated pulmonary vascular resistance that produces cyanosis in the presence of intra- & extracardiac communications without pulmonic stenosis is termed Eisenmenger syndrome.

45 In peripheral cyanosis of extremities, the arterial blood is ?*Harrison's 18th Ed. 289*

- A. Normally saturated with oxygen
- B. Over saturated with oxygen
- C. Under saturated with oxygen
- D. Any of the above

46 Clubbing without cyanosis is frequent in ?*Harrison's 18th Ed. 290*

- A. Infective endocarditis
- B. Inflammatory bowel disease
- C. Jackhammer operators
- D. All of the above

Clubbing without cyanosis is frequent in infective endocarditis, inflammatory bowel disease & in jackhammer operators.

Edema

47 Edema is defined as a clinically apparent increase in ?*Harrison's 18th Ed. 290*

- A. Intracellular fluid volume
- B. Plasma volume
- C. Interstitial fluid volume
- D. All of the above

Edema is defined as a clinically apparent increase in interstitial fluid volume.

48 Which of the following is referred to as "tissue tension" ?

Harrison's 17th Ed. 232

- A. Hydrostatic pressure within the vascular system
- B. Colloid oncotic pressure within the vascular system
- C. Hydrostatic pressure within the interstitial fluid
- D. All of the above

Plasma & interstitial fluid are two components of extracellular fluid regulate by Starling forces. Hydrostatic pressure within interstitial fluid is referred to as the tissue tension which promotes the movement of fluid into the vascular compartment.

49 Movement of water & diffusible solutes from vascular space into the interstitial space occurs at ?

Harrison's 18th Ed. 290

- A. Arteriolar end of capillaries
- B. Venous end of capillaries
- C. Lymphatics
- D. All of the above

Movement of water & diffusible solutes from vascular space into interstitial space occurs at the arteriolar end of capillaries. Fluid is returned from interstitial space into vascular system at the venous end of capillary & by way of lymphatics.

50 Conditions that reduce effective arterial blood volume cause constriction of which of the following ?

Harrison's 17th Ed. 232

- A. Renal afferent arteriolar constriction
- B. Renal efferent arteriolar constriction
- C. Renal glomerular capillary constriction
- D. All of the above

Heart failure, nephrotic syndrome & cirrhosis reduce effective arterial blood volume and cause renal efferent arteriolar constriction.

51 Which of the following stimulates renin release ?

Harrison's 18th Ed. 291

- A. Diminished stretch of the juxtaglomerular cells
- B. Low sodium chloride load in distal renal tubules
- C. Circulating catecholamines
- D. All of the above

Diminished renal blood flow resulting in diminished stretch of juxtaglomerular cells lowers sodium chloride load reaching distal renal tubules signals juxtaglomerular cells to secrete renin. Activation of β -adrenergic receptors in juxtaglomerular cells by sympathetic nervous system & circulating catecholamines stimulates renin release.

52 Angiotensinogen is synthesized by ?

Harrison's 18th Ed. 291

- A. Kidney
- B. Liver
- C. Pancreas
- D. Lung

Angiotensinogen, an α_2 globulin, is synthesized by liver. Renin converts angiotensinogen to a decapeptide angiotensin I, which is broken down to an octapeptide angiotensin II.

53 Renin is which of the following kinds ?

Harrison's 18th Ed. 291

- A. Enzyme
- B. Pro-hormone
- C. Hormone
- D. Cofactor

Renin is an enzyme with a molecular weight of ~40,000 secreted by juxtaglomerular cells.

54 Renal effects of Angiotensin II are mediated by activation of which type of Angiotensin II receptors ?

Harrison's 17th Ed. 232

- A. Type 1
- B. Type 2
- C. Type 3
- D. Type 4

Angiotensin II produces renal vasoconstriction & salt and water retention. These renal effects are mediated by activation of Angiotensin II type 1 receptors.

55 Aldosterone is produced by ?

Harrison's 18th Ed. 291

- A. Juxtaglomerular cells of kidney
- B. Macula densa cells of kidney
- C. Zona glomerulosa of adrenal cortex
- D. Zona reticularis of adrenal cortex

Aldosterone is produced by zona glomerulosa of adrenal cortex & its release is stimulated by Angiotensin II.

56 In heart failure, aldosterone secretion is elevated due to ?

Harrison's 18th Ed. 291

- A. Prolongation of biologic half-life
- B. Increased secretion
- C. Reduced hepatic catabolism
- D. All of the above

In heart failure, levels of aldosterone are raised due to increased secretion, prolonged biologic half-life & reduced hepatic catabolism due to reduced hepatic blood flow, secondary to reduction in cardiac output.

57 Activation of Renin-Angiotensin-Aldosterone (RAA) system is most striking in which of the following ?

Harrison's 17th Ed. 232

- A. Acute, severe heart failure
- B. Chronic heart failure
- C. Stable heart failure
- D. Compensated heart failure

Activation of RAA system is seen conspicuously in early phase of acute, severe heart failure & is less intense in patients with chronic, stable, compensated heart failure.

58 Mineralocorticoid escape phenomenon is best explained by ?

Harrison's 18th Ed. 292

- A. Deficit in effective arterial blood volume
- B. Aldosterone antagonism
- C. Pressure natriuresis
- D. Blocking of epithelial sodium channels

Administration of potent mineralocorticoids (deoxycorticosterone acetate or fludrocortisone) leads to salt & water retention. This accumulation is self-limiting, despite continued exposure to steroid, a phenomenon known as mineralocorticoid escape wherein edema does not develop. It is due to an increase in GFR (pressure natriuresis).

59 Atrial natriuretic peptide (ANP) is stored in secretory granules within ?

Harrison's 18th Ed. 292

- A. Sinoatrial node
- B. Atrial myocytes
- C. Pulmonary veins

D. All of the above

Polypeptide ANP is secreted by atrial myocytes secondary to atrial distention and/or sodium load. Its actions are excretion of sodium & water by increasing GFR, inhibiting sodium reabsorption in PCT & inhibiting release of renin & aldosterone. It also antagonizes vasoconstrictor actions of Angiotensin II, AVP & sympathetic stimulation causing arteriolar & venous dilatation.

60 Brain natriuretic peptide (BNP) is present in ?

Harrison's 18th Ed. 292

- A. Cardiac ventricular myocardium
- B. Cerebral cortex
- C. Cerebellum
- D. All of the above

BNP is stored in cardiac ventricular myocardium & is released when ventricular diastolic pressure rises. Its actions are similar to ANP. Circulating levels of ANP & BNP are elevated in CHF.

61 Antihypertensive agents associated with edema formation include all except ?

Harrison's 18th Ed. 293 Table 36-1

- A. Minoxidil
- B. Hydralazine
- C. Clonidine
- D. Atenolol

62 Antihypertensive agents associated with edema formation include all except ?

Harrison's 18th Ed. 293 Table 36-1

- A. Methyldopa
- B. Calcium channel antagonists
- C. ACE Inhibitors
- D. Alpha Adrenergic antagonists

63 Steroid hormones associated with edema formation include all except ?

Harrison's 18th Ed. 293 Table 36-1

- A. Glucocorticoids
- B. Mineralocorticoids
- C. Anabolic steroids
- D. Estrogens / Progestins

64 Which of the following is associated with edema formation ?

Harrison's 18th Ed. 293 Table 36-1

- A. Cyclosporine
- B. Growth hormone
- C. Interleukin 2
- D. All of the above

65 Which of the following is false about idiopathic edema ?

Harrison's 17th Ed. 234

- A. Occurs in women
- B. Edema unrelated to menstrual cycle
- C. Occurs after upright posture
- D. None of the above

Idiopathic cyclic edema occurs almost exclusively in women, is characterized by periodic episodes of edema (unrelated to menstrual cycle), frequently accompanied by abdominal distention orthostatic retention of sodium & water after upright posture.

66 Causes of facial edema include ?

Harrison's 18th Ed. 294

- A. Trichinosis
- B. Allergic reactions
- C. Myxedema
- D. All of the above

*Apart from hypoproteinemia, causes of facial edema include trichinosis (*Trichinella spiralis*), allergic reactions & myxedema. Trichinosis can also lead to membranous glomerulopathy, proliferative glomerulonephritis & acute pericarditis. Trichinosis is a cause of FUO.*

67 Venous pressure in upper extremities is elevated in all except ?

Harrison's 17th Ed. 235

- A. Advanced heart failure
- B. Constrictive pericarditis
- C. Tricuspid stenosis
- D. Cirrhosis liver

Venous pressure in upper extremities is elevated in advanced heart failure, constrictive pericarditis or tricuspid stenosis but is normal in cirrhosis. In hepatic cirrhosis, JVP is normal.

Chapter 227. Physical Examination of the Cardiovascular System

68 Stethoscope was first introduced by ?

- A. Austin Flint
- B. Barlow
- C. René Laennec
- D. Richard Cabot

Stethoscope was first introduced by René Laennec in 1819.

69 Which of the following is not related to infective endocarditis ?

Harrison's 17th Ed. 1382

- A. Subungual hemorrhages
- B. Osler's nodes
- C. Nikolsky's sign
- D. Janeway lesions

Infective endocarditis may present as petechiae, Osler's nodes and Janeway lesions. Staphylococcal scalded-skin syndrome is seen in children and in immunocompromised adults. Generalized erythema is often evident during the prodrome of fever and malaise; profound tenderness of the skin is distinctive. In the exfoliative stage, the skin can be induced to form bullae with light lateral pressure (Nikolsky's sign).

70 Which of the following is false about diabetic retinopathy ?

Harrison's 17th Ed. 1382

- A. Microaneurysms just temporal to fovea
- B. Cotton-wool infarcts circularly around the disc
- C. Yellow exudates
- D. Nonproliferative retinopathy found in almost all individuals with DM for >10 years

Early diabetic microaneurysms are found just temporal to fovea, along horizontal raphe & cotton-wool infarcts are found circularly around disc. Nonproliferative retinopathy is found in almost all individuals who have had DM for >20 years.

71 Which of the following retinal emboli is most common ?

Harrison's 17th Ed. 1382

- A. Platelet emboli
- B. Hollenhorst plaques
- C. Calcium emboli

- D. Uric acid emboli

Platelet emboli in retinal artery is most common.

72 When ascites is out of proportion to peripheral edema, which of the following should be suspected ?

Harrison's 17th Ed. 1382

- A. Tricuspid regurgitation
- B. Budd Chiari Syndrome
- C. Constrictive pericarditis
- D. Cirrhosis liver

Constrictive pericarditis is a possibility when ascites is out of proportion to peripheral edema.

73 Atherosclerosis of the peripheral arteries may produce intermittent claudication of ?

Harrison's 17th Ed. 1382

- A. Buttock
- B. Calf
- C. Thigh
- D. Any of the above

Atherosclerosis of peripheral arteries of lower extremities produces intermittent claudication of buttock, calf, thigh, or foot.

74 What resting ankle-brachial index is consistent with critical ischemia, rest pain & tissue loss ?

Harrison's 17th Ed. 1383

- A. < 0.3
- B. < 0.5
- C. < 0.7
- D. < 0.9

Resting ABI < 0.9 is considered abnormal. ABI < 0.3 is consistent with critical ischemia, rest pain, and tissue loss.

75 Which of the following statements is false ?

Harrison's 17th Ed. 1383

- A. Anacrotic shoulder is present on ascending limb
- B. Incisura coincides with the aortic valve closure
- C. Peripherally, incisura is replaced by dicrotic notch
- D. None of the above

In normal central aortic pulse wave, anacrotic shoulder is present on ascending limb. Descending limb has a sharp downward deflection called incisura coinciding with aortic valve closure. Peripherally, anacrotic shoulder is less apparent & incisura is replaced by dicrotic notch.

76 Pulse more evident in a peripheral artery is ?

Harrison's 17th Ed. 1383

- A. Pulsus bigeminus
- B. Pulsus bisferiens
- C. Pulsus paradoxus
- D. Dicrotic pulse

77 Pulse more evident in a peripheral artery is ?

Harrison's 17th Ed. 1383

- A. Pulsus bigeminus
- B. Pulsus alternans
- C. Pulsus paradoxus
- D. Dicrotic pulse

Bisferiens pulse (in AR) & pulsus alternans are more evident in peripheral arteries.

78 "Trisection" is a method for ?

Harrison's 17th Ed. 1383

- A. Assessing chest expansion
- B. Assessing character of arterial pulse
- C. Assessing postural fall of blood pressure
- D. Assessing pulse, BP and respiration

Trisection is a method for assessing the sharpness of upstroke, systolic peak and diastolic slope of the arterial pulse.

79 Pulsus parvus is found in which of the following conditions ?

Harrison's 17th Ed. 1383

- A. Diminished left ventricular stroke volume
- B. Narrow pulse pressure
- C. Increased peripheral vascular resistance
- D. All of the above

Pulsus parvus is seen in conditions with diminished left ventricular stroke volume, narrow pulse pressure & increased peripheral vascular resistance.

80 Pulsus tardus is found in ?

Harrison's 17th Ed. 1383

- A. Mitral stenosis
- B. Aortic valve stenosis
- C. Aortic regurgitation
- D. Mitral regurgitation

Pulsus tardus is seen in aortic valve stenosis (delayed systolic peak due to obstruction to left ventricular ejection).

81 Bounding or hyperkinetic pulse is associated with ?

Harrison's 17th Ed. 1383

- A. Increased left ventricular stroke volume
- B. Wide pulse pressure
- C. Decrease in peripheral vascular resistance
- D. All of the above

Large, bounding or hyperkinetic pulse occurs in complete heart block, anxiety, anemia, exercise, fever, PDA, peripheral AV fistula, mitral regurgitation or ventricular septal defect & aortic regurgitation.

82 Which of the following about bisferiens pulse is false ?

Harrison's 17th Ed. 1383

- A. Has two systolic peaks
- B. Characteristic of aortic regurgitation (AR)
- C. Characteristic of hypertrophic cardiomyopathy (HOCM)
- D. First systolic peak in HOCM is called "tidal wave"

Bisferiens pulse has two systolic peaks is characteristic of AR (with or without stenosis) & HOCM. In HOCM, pulse wave upstroke rises rapidly and forcefully, producing the "first systolic peak called percussion wave". Tidal wave is a smaller and slowly rising positive pulse wave produced by continued ventricular ejection and by reflected waves from the periphery.

83 Which of the following about dicrotic pulse is false ?

Harrison's 17th Ed. 1383

- A. Has 2 palpable waves, one each in systole & diastole
- B. Usually denotes a very low stroke volume
- C. Found in restrictive cardiomyopathy
- D. Found in dilated cardiomyopathy

Dicrotic pulse has 2 palpable waves, one each in systole & diastole. It denotes a very low stroke volume as in dilated cardiomyopathy.

84 Which of the following about pulsus alternans is false ?*Harrison's 17th Ed. 1384*

- A. Regular alteration of pressure pulse amplitude
- B. Irregular rhythm
- C. Indicates severe impairment of LV function
- D. May occur during or following paroxysmal tachycardia

In pulsus alternans, rhythm is regular, but regular alteration of pressure pulse amplitude. It is due to alternating LV contractile force indicating severe impairment of LV function. Loud S3 is frequently heard. It may occur during or following paroxysmal tachycardia or for several beats following a premature beat in patients without heart disease.

85 Pulsus bigeminus is found in ?*Harrison's 17th Ed. 1384*

- A. Premature atrial contraction
- B. Premature ventricular contraction
- C. In ventricular tachycardia
- D. In PSVT

Regular alteration of pressure pulse amplitude occur in pulsus bigeminus, but caused by premature ventricular contraction that follows each regular beat.

86 Pulsus paradoxus is found in ?*Harrison's 17th Ed. 1384*

- A. Pericardial tamponade
- B. Airway obstruction
- C. Superior vena cava obstruction
- D. All of the above

Pulsus paradoxus is found in patients with pericardial tamponade, airway obstruction, or superior vena cava obstruction.

87 Pulsus paradoxus is defined as a decrease in systolic arterial pressure of ?*Harrison's 17th Ed. 1491*

- A. > 10 mm Hg with inspiration
- B. > 20 mm Hg with inspiration
- C. > 30 mm Hg with inspiration
- D. > 40 mm Hg with inspiration

Pulsus paradoxus is defined as a decrease in systolic arterial pressure of >10 mm Hg with inspiration.

88 Radial & femoral arterial pulses are not coincident in ?*Harrison's 17th Ed. 1384*

- A. Aortic dissection
- B. Aortic coarctation
- C. HOCM
- D. All of the above

Normally, radial & femoral arterial pulses are virtually coincident except in aortic coarctation.

89 Which of the following statements is false ?*Harrison's 16th Ed. 1305*

- A. Peripheral atherosclerosis is a risk factor for IHD
- B. Edema is a late sign of heart failure
- C. In CHF, edema involves right leg prior to left
- D. None of the above

Peripheral atherosclerosis is an important risk factor for coincident ischemic heart disease. Edema is a late sign of heart failure, it involves the right leg prior to the left.

90 Pulsation of the internal jugular vein is greatest when the trunk is inclined by ?*Harrison's 17th Ed. 1384*

- A. < 15°
- B. < 30°
- C. < 45°
- D. < 60°

Right internal jugular vein is best for examination of neck veins for inspection of their waveform & estimation of CVP. Pulsation of internal jugular vein is greatest when trunk is inclined by < 30°.

91 Which of the following waves in JVP is negative ?*Harrison's 17th Ed. 1384*

- A. a
- B. y
- C. c
- D. v

92 JVP waveforms reflect pressure changes in which of the following cardiac chambers ?*Harrison's 17th Ed. 1384*

- A. Right atrium
- B. Right ventricle
- C. Left atrium
- D. Left ventricle

JVP reflects phasic pressure changes in right atrium and consists of a, c and v positive waves and x and y negative waves.

93 The wave produced due to atrial relaxation is ?*Harrison's 17th Ed. 1384*

- A. a
- B. v
- C. x
- D. y

94 Which of the following wave is produced at the time of right ventricular isovolumetric systole ?*Harrison's 17th Ed. 1384*

- A. a
- B. c
- C. v
- D. y

"a" wave is a positive presystolic dominant wave in JVP due to right atrial contraction. "c" wave is a positive wave due to bulging of tricuspid valve into RA during RV isovolumetric systole & by impact of carotid artery adjacent to jugular vein. "v" wave is a positive late systolic due to increasing volume of blood in RA during ventricular systole. "x" descent (negative wave) is due to atrial relaxation and to downward displacement of tricuspid valve during ventricular systole. "y" descent (negative wave) is due to opening of tricuspid valve and rapid inflow of blood into RV.

95 Which of the following wave is dominant wave in JVP during inspiration ?*Harrison's 17th Ed. 1384*

- A. a
- B. c
- C. x
- D. y

96 "Cannon" "a" waves may occur regularly in which of the following conditions ?

Harrison's 17th Ed. 1384

- A. During junctional rhythm
- B. AV dissociation with VT
- C. Complete heart block
- D. All of the above

Large "a" waves occur during arrhythmias when RA contracts with tricuspid valve closed. "Cannon" "a" waves occur regularly during junctional rhythm and occur irregularly during AV dissociation with VT or CHB.

97 Large "a" waves may occur in all of the following conditions except ?

Harrison's 17th Ed. 1384

- A. Atrial fibrillation
- B. Tricuspid stenosis
- C. Pulmonary hypertension
- D. Pulmonic stenosis

Large "a" waves indicate that RA is contracting against increased resistance as in TS, pulmonary hypertension or PS. "a" wave is absent in atrial fibrillation due to ineffective contraction of atria.

98 Cause of increased delay between "a" & "c" wave in JVP is ?

Harrison's 17th Ed. 1384

- A. 1° heart block
- B. 2° heart block
- C. 3° heart block
- D. All of the above

Increased delay occurs between "a" wave and carotid arterial pulse or "c" wave in patients with first-degree atrioventricular block.

99 Which of the following is seen in tricuspid regurgitation ?

Harrison's 17th Ed. 1384

- A. Obliteration of "x" descent
- B. Prominent "v" wave
- C. Rapid, deep "y" descent in early diastole
- D. All of the above

Tricuspid regurgitation (TR) causes the v wave to be more prominent. When TR becomes severe, combination of a prominent v wave & obliteration of x descent results in a single large positive systolic wave. A rapid, deep y descent in early diastole occurs with severe TR.

100 In JVP, which of the following is seen in constrictive pericarditis ?

Harrison's 17th Ed. 1384

- A. Sharp "y" descent
- B. Deep "y" trough
- C. Rapid ascent to baseline
- D. All of the above

A venous pulse characterized by a sharp y descent, a deep y trough, and a rapid ascent to the baseline is seen in patients with constrictive pericarditis or with severe right-sided heart failure and a high venous pressure.

101 In JVP, which of the following is a typical feature of tricuspid stenosis ?

Harrison's 17th Ed. 1384

- A. Prominent "v" wave
- B. Slow "y" descent
- C. Obliteration of "x" descent

D. Deep "y" trough

A slow "y" descent in JVP suggests an obstruction to right ventricular filling as occurs with tricuspid stenosis or right atrial myxoma. Prominent "v" wave & obliteration of "x" descent is seen in Tricuspid regurgitation. Deep "y" trough is seen in constrictive pericarditis.

102 Center of right atrium lies ~5 cm. below sternal angle in which position of the patient ?

Harrison's 17th Ed. 1384

- A. Supine
- B. 30° recline
- C. 45° recline
- D. Any of the above

Right internal jugular is the best vein for accurate estimation of CVP. Center of RA lies ~5 cm. below sternal angle "regardless of body position".

103 CVP is normally expressed as ?

Harrison's 17th Ed. 1384

- A. Millimeter of Mercury
- B. Centimeter of Mercury
- C. Millimeter of blood
- D. Centimeter of blood

Vertical distance between top of the oscillating jugular venous column and the level of sternal angle is expressed in centimeters of blood. (1.36 cmH₂O = 1.0 mmHg).

104 Most common cause of a high jugular venous pressure is ?

Harrison's 17th Ed. 1384

- A. Elevated right atrial diastolic pressure
- B. Elevated right atrial systolic pressure
- C. Elevated right ventricular diastolic pressure
- D. Elevated right ventricular systolic pressure

Most common cause of a high jugular venous pressure is elevated right ventricular diastolic pressure.

105 Which of the following statements about abdominojugular test is false ?

Harrison's 17th Ed. 1384

- A. Firm pressure over midabdomen for >30 seconds
- B. In normal persons, does not alter JVP significantly
- C. Rapid drop of 4 cm on release of compression
- D. Most common cause is right-sided heart failure

Positive test is best defined as increase in JVP during 10 seconds of firm midabdominal compression followed by a rapid drop in pressure of 4 cm blood on release of the compression.

106 Which of the following about Kussmaul's sign is false ?

Harrison's 17th Ed. 1384

- A. Increase in CVP during inspiration
- B. Caused by severe right-sided heart failure
- C. Frequent in constrictive pericarditis
- D. Frequent in left ventricular infarction

Kussmaul's sign refers to an increase in CVP during inspiration. Its causes include severe right-sided heart failure, constrictive pericarditis and right ventricular infarction.

107 The normal left ventricular apex impulse is ?

Harrison's 16th Ed. 1306

- A. Early systolic
- B. Mid systolic

- C. Late systolic
- D. Any of the above

108 Normal location of left ventricular apex impulse is ?

Harrison's 17th Ed. 1385

- A. III or IV ICS
- B. IV or V ICS
- C. V or VI ICS
- D. Any of the above

Best felt with fingertips, normal left ventricular apex impulse is located at or medial to left midclavicular line in 4th or 5th intercostal space with a tapping character & early systolic timing.

109 Normal diameter of left ventricular apex impulse is about ?

Harrison's 16th Ed. 1306

- A. 2.5 cm
- B. 3.0 cm
- C. 3.5 cm
- D. 4.0 cm

Early systolic outward thrust of left ventricular apex impulse is localized & the usual diameter is less than 2.5 cm.

110 Abnormal systolic precordial pulsations in patients with left ventricular dyssynergy are most commonly felt in ?

Harrison's 17th Ed. 1385

- A. Apex
- B. Left midprecordium
- C. Base of the heart
- D. Left lower sternal border

Abnormal precordial pulsations occur during systole in patients with left ventricular dyssynergy due to IHD, most commonly in left midprecordium one or two interspaces above and/or 1 to 2 cm medial to left ventricular apex.

111 Which of the following statements about left parasternal lift is false ?

Harrison's 16th Ed. 1306

- A. Frequent in patients with severe mitral regurgitation
- B. Synchronous with 'v' wave in left atrial pressure curve
- C. Occurs simultaneously with LV apical impulse
- D. Due to anterior displacement of RV by expanding LA

Typical left parasternal lift is seen in severe mitral regurgitation. This pulsation occurs distinctly "later" than the LV apical impulse, is synchronous with the v wave in left atrial pressure curve. It is due to anterior displacement of right ventricle by an enlarged, expanding left atrium.

112 Pulsation of right sternoclavicular joint may indicate ?

Harrison's 16th Ed. 1306

- A. Aneurysmal dilation of ascending aorta
- B. Pulmonary artery pulsation
- C. Tricuspid stenosis
- D. Tricuspid regurgitation

Pulsation of the right sternoclavicular joint may indicate a right-sided aortic arch or aneurysmal dilation of the ascending aorta.

113 Which of the following is false about hypertrophic cardiomyopathy ?

Harrison's 16th Ed. 1306

- A. Double systolic apical impulse
- B. Bisferiens pulse

- C. Sustained handgrip exercise diminishes systolic murmur
- D. None of the above

Bisferiens pulse has 2 systolic peaks & is characteristic of HOCM. Sustained handgrip exercise, squatting diminishes & Valsalva maneuver, standing increases systolic murmur of HOCM.

114 Which of the following is not true about 'Thrills' ?

Harrison's 17th Ed. 1385

- A. Palpable
- B. High-frequency vibrations
- C. Associated with heart murmurs
- D. Better felt with the palm of hand

Thrills are palpable "low-frequency" vibrations associated with heart murmurs. In MR, thrill is felt at the cardiac apex, while in VSD, it is felt in III & IV ICS near left sternal border. When palm of hand is placed over precordium, thrill of AS crosses palm toward right side of neck, while thrill of pulmonic stenosis radiates more to left side of the neck.

115 Normal splitting of two components of S₁ is by ?

Harrison's 17th Ed. 1385

- A. 5 to 10 milliseconds
- B. 8 to 15 milliseconds
- C. 10 to 30 milliseconds
- D. 25 to 40 milliseconds

Normally, two high-pitched components of S₁ are split by 10 - 30 milliseconds. First component of S₁ is mitral valve closure and the second is due to tricuspid valve closure.

116 Reversed splitting of S₁ may be present in patients with ?

Harrison's 16th Ed. 1307

- A. Severe mitral stenosis
- B. Left atrial myxoma
- C. Left bundle branch block
- D. All of the above

Widening of S₁ is due to complete right bundle branch block. Reversed splitting of S₁, where the mitral sound follows tricuspid sound, is heard in severe mitral stenosis, left atrial myxoma and left bundle branch block.

117 Intensity of the first heart sound is influenced by all except ?

Harrison's 17th Ed. 1385

- A. Position of mitral leaflets at onset of ventricular systole
- B. Rate of rise of left ventricular pressure pulse
- C. Left ventricular end diastolic pressure
- D. Structural disease of mitral valve

118 S₁ is louder in which of the following conditions ?

Harrison's 17th Ed. 1385

- A. Tachycardia
- B. Mitral stenosis
- C. Short PR interval
- D. All of the above

Loudness of S₁ depends upon the position of mitral leaflets at the beginning of ventricular systole. The farther apart they are at this time, louder will be the sound of S₁. This occurs in tachycardia, MS and short PR interval.

119 Hangout time is related to ?

Harrison's 17th Ed. 1385

- A. Resistance to pulmonary vascular bed
- B. Resistance to right ventricular filling
- C. Resistance to left ventricular outflow

D. Resistance to left ventricular filling

P_2 is coincident with incisura of PA pressure curve, which is separated from RV pressure tracing by an interval called hangout time. Absolute value of this interval reflects the resistance to pulmonary vascular bed.

120 In pulmonary hypertension, splitting of S2 may be ?

Harrison's 17th Ed. 1385

- A. Diminished
- B. Normal
- C. Accentuated
- D. Any of the above

In pulmonary hypertension, P2 component of S2 is loud. As the severity of pulmonary hypertension increases, the splitting of S2 may vary from normal, increased to decreased.

121 Fixed splitting of second heart sound diagnostic of ?

Harrison's 17th Ed. 1385

- A. ASD
- B. VSD
- C. PDA
- D. Tetralogy of Fallot

Due to volume and duration of right ventricular ejection remaining the same during inspiration and expiration, there is little inspiratory exaggeration of the splitting of S2 in ASD.

122 Abnormal splitting of S2 is best heard in which area ?

Harrison's 17th Ed. 1385

- A. Apex
- B. Pulmonic area
- C. Aortic 1 area
- D. Tricuspid area

Splitting of S2 that persists with expiration when the patient is in the upright position is heard best at the pulmonic area.

123 Early aortic valve closure (A2), occurs in ?

Harrison's 16th Ed. 1307

- A. Mitral regurgitation
- B. VSD
- C. Constrictive pericarditis
- D. All of the above

Aortic valve closes early in mitral regurgitation, ventricular septal defect and constrictive pericarditis. The S2 splitting persists during expiration.

124 Reversed (paradoxical) splitting of S2 is seen in ?

Harrison's 17th Ed. 1385

- A. Left bundle branch block
- B. Right ventricular ectopic beat
- C. Severe aortic outflow obstruction
- D. All of the above

In reversed or paradoxical splitting of S2, P2 precedes A2. Splitting is maximal in expiration and decreases during inspiration. Events that delay closure of aortic valves paradoxical S2 splitting.

125 On cardiac auscultation, P_2 louder than A_2 suggests pulmonary hypertension except in patients with ?

Harrison's 17th Ed. 1385

- A. VSD
- B. ASD
- C. MR

D. MS

P2 is normally softer than A2 in 2nd left intercostal space. P2 that is greater than A2 in this area suggests pulmonary hypertension, except in patients with atrial septal defect.

126 Which of the following right-sided acoustical event is heard better during expiration ?

Harrison's 16th Ed. 1308

- A. Opening snap
- B. Pulmonary ejection sound
- C. S3
- D. S4

Pulmonary ejection sound is loudest at the upper left sternal border and unlike most other right-sided acoustical events, is heard better during expiration.

127 The timing of ejection sounds is ?

Harrison's 17th Ed. 1385

- A. Early systole
- B. Mid systole
- C. Late systole
- D. Any of the above

Ejection sound is a sharp, high-pitched event in early systole, closely following S1. They occur in presence of semilunar valve stenosis & with dilation of aorta or pulmonary artery.

128 Which of the following statements about "nonejection clicks" is false ?

Harrison's 17th Ed. 1385

- A. Heard in mitral valve prolapse
- B. Heard best in pulmonary area
- C. May be single or multiple
- D. May occur at any time in systole

Nonejection or midsystolic clicks are due to prolapse of mitral valve leaflets. They are best heard along the lower left sternal border & at left ventricular apex. They may be single or multiple & may occur at any time in systole but usually later than systolic ejection sound.

129 What is the character of opening snap (OS) ?

Harrison's 17th Ed. 1386

- A. Low-pitched
- B. High-pitched
- C. Variable-pitched
- D. Any of the above

Opening snap (OS) is a high-pitched, early diastolic sound, usually due to mitral stenosis. It is generally heard best at the lower left sternal border and radiates well to the base of the heart.

130 The normal A2-OS interval is ?

Harrison's 17th Ed. 1386

- A. 0.04 to 0.06 seconds
- B. 0.04 to 0.08 seconds
- C. 0.04 to 0.10 seconds
- D. 0.04 to 0.12 seconds

A2-OS interval is inversely related to height of mean LA pressure & ranges from 0.04 - 0.12 seconds.

131 What duration after A2 is the third heart sound (S3) heard ?

Harrison's 17th Ed. 1386

- A. 0.04 to 0.08 seconds
- B. 0.08 to 0.12 seconds

- C. 0.12 to 0.14 seconds
- D. 0.14 to 0.16 seconds

S3 is a low-pitched sound produced in ventricle, 0.14 - 0.16 seconds after A2 at the termination of rapid filling.

132 S3 is normally heard in ?

Harrison's 17th Ed. 1386

- A. In normal children
- B. Pregnancy
- C. Anemia
- D. All of the above

S3 is frequent in normal children & in patients with high cardiac output. In individuals >40 years, S3 usually indicates impairment of ventricular function.

133 Which of the following may radiate to subclavian and carotid arteries ?

Harrison's 16th Ed. 1308

- A. S1
- B. S2
- C. S3
- D. OS

Both left-sided S3 & S4 sounds increase with isometric exercise and both may radiate to the subclavian & carotid arteries.

134 Pericardial knock is a variant of ?

Harrison's 17th Ed. 1386

- A. S1
- B. S2
- C. S3
- D. S4

S3 that is earlier (0.10 - 0.12 seconds after A2) & higher-pitched than normal occurs in patients with constrictive pericarditis and is called pericardial knock.

135 All of the following are heard best at the left ventricular apex except ?

Harrison's 16th Ed. 1308

- A. Aortic ejection sound
- B. Opening snap (OS)
- C. Third heart sound (S3)
- D. Fourth heart sound (S4)

Aortic ejection sound, S3, and S4 are heard best at the left ventricular apex. OS is heard best at the lower left sternal border and radiates to the base of the heart.

136 S₄ is frequently present in ?

Harrison's 17th Ed. 1386

- A. Systemic hypertension
- B. Aortic stenosis
- C. Hypertrophic cardiomyopathy
- D. All of the above

S₄ is frequent in systemic hypertension, AS, HOCM, IHD and acute MR.

137 Loudness of cardiac murmurs is graded from ?

Harrison's 17th Ed. 1386

- A. 0 to V
- B. 0 to VI
- C. 1 to V

- D. 1 to VI

138 If thrill is palpable, cardiac murmur is of which grade ?

Harrison's 17th Ed. 1386

- A. I
- B. II
- C. III
- D. IV

Loudness of cardiac murmurs is graded from I to VI. Grade I murmur is heard only with special effort, grade IV murmur is accompanied by a thrill while grade VI murmur is audible with the stethoscope removed from contact with the chest.

139 Murmur of HOCM becomes louder with ?

Harrison's 17th Ed. 1386

- A. Standing
- B. Squatting
- C. Passive leg raising
- D. All of the above

With standing, most cardiac murmurs diminish, but those of HOCM & MVP becomes louder. With squatting & passive leg raising, most murmurs become louder, but those of HOCM & MVP soften & may disappear.

140 Murmur of HOCM becomes louder with ?

Harrison's 17th Ed. 1386

- A. Valsalva maneuver
- B. Squatting
- C. Passive leg raising
- D. Exercise

In Valsalva maneuver, most murmurs decrease in intensity. Systolic murmur of HOCM & MVP becomes louder. Murmur of HOCM decreases with exercise.

141 Which of the following about murmur of HCM is false ?

Harrison's 17th Ed. 1386

- A. With exercise, murmur of HCM decreases
- B. With Valsalva maneuver, HCM murmur becomes louder
- C. With standing, murmur of HCM becomes louder
- D. None of the above

142 Which of the following about HOCM is false ?

Harrison's 17th Ed. 1386

- A. Murmur is produced by LV outflow obstruction & MR
- B. Murmur intensity does not exceed grade 3
- C. Murmur increases with reduction in preload / afterload
- D. Murmur decreases with augmentation of contractility

Murmur of HOCM increase in intensity with maneuvers that result in increasing degrees of outflow tract obstruction, such as a reduction in preload or afterload (Valsalva, standing, vasodilators) or to an augmentation of contractility (inotropic stimulation). Maneuvers that increase preload (squatting, passive leg raising, volume administration) or afterload (squatting, vasopressors) or that reduce contractility (beta blockers) decrease intensity of murmur.

143 Which of the following about Still's murmur ?

Harrison's 17th Ed. 1386

- A. Benign grade 2 murmur
- B. Vibratory mid-systolic murmur
- C. At lower left sternal border
- D. In elderly

Still's murmur refers to a benign grade 2, vibratory mid-systolic murmur at the lower left sternal border in normal children and adolescents.

144 Which of the following produces a cardiac murmur that is plateau in configuration ?

Harrison's 17th Ed. 1386

- A. ASD
- B. MVP
- C. Chronic MR
- D. VSD

Holosystolic murmur of chronic MR is high pitched & plateau in configuration because of wide difference between LV & LA pressure throughout systole.

145 "Maladie de Roger" relates to ?

Harrison's 17th Ed. 1386, N Engl J Med 2010;363:22

- A. ASD
- B. PDA
- C. Congenital AS
- D. Small, restrictive VSDs

Small, restrictive VSDs (maladie de Roger) produces a very loud murmur due to significant & sustained systolic pressure gradient between LV & RV. Maladie de Roger describes patients with asymptomatic ventricular septal defects. Patients with symptomatic ventricular septal defects, which cause cyanosis and progressive pulmonary hypertension, have Eisenmenger's syndrome.

146 Gibson's murmur is best heard at ?

N Engl J Med 2010;363:22

- A. Left upper sternal border
- B. Left lower sternal border
- C. Apex
- D. Left interscapular region

Gibson's continuous murmur may be audible from the back, at the left interscapular region, or cranial to the scapular spine. Although the murmur is audible over the entire base of the heart, Gibson's murmur is best heard at the left upper sternal border.

147 Which of the following is false about Gibson's murmur ?

N Engl J Med 2010;363:22

- A. Caused by a persistent patent ductus arteriosus
- B. Begins after the first heart sound
- C. Grows louder as the child ages
- D. None of the above

George Gibson's murmur is caused by a persistent patent ductus arteriosus. Gibson murmur is continuous, beginning after the first heart sound and extends through the second heart sound. It may diminish during diastole. The murmur grows louder as the child ages and arterial dilation increases, and the area of maximal intensity may migrate farther left.

148 Graham Steell murmur is best heard at ?

N Engl J Med 2010;363:22

- A. Left upper sternal border
- B. Left lower sternal border
- C. Apex
- D. Left interscapular region

Graham Steell murmur is a soft, blowing, decrescendo diastolic murmur running off of an accentuated second sound that mimics the murmur of aortic insufficiency. The Graham Steell murmur is best heard in a localized area at the left upper sternal border.

149 Key - Hodgkin murmur is best related to ?

N Engl J Med 2010;363:22

- A. Aortic stenosis
- B. Aortic regurgitation
- C. Pericarditis

D. Endocarditis

Key - Hodgkin murmur is a diastolic murmur of aortic regurgitation. It has a raspy quality, similar to the sound of a saw cutting through wood.

150 Which of the following is best heard at left upper sternal border ?

N Engl J Med 2010;363:22

- A. Graham Steell murmur
- B. Gibson's murmur
- C. Roger's murmur
- D. All of the above

151 Who, from the following, was from Scotland ?

N Engl J Med 2010;363:22

- A. Henri-Louis Roger
- B. George Frederic Still
- C. Graham Steell
- D. George Gibson

Scottish cardiologist Graham Steell was an avid horseman and iconoclast.

152 Who, from the following, is called father of British pediatrics ?

N Engl J Med 2010;363:22

- A. Henri-Louis Roger
- B. George Frederic Still
- C. Graham Steell
- D. George Gibson

English physician George Frederic Still, the father of British pediatrics, is best known for his eponymous rheumatic disorders: a juvenile febrile arthritis and a more typhoidal illness in adults, both called Still's disease.

153 Which of the following is false about Still's murmur ?

N Engl J Med 2010;363:22

- A. Most often seen in children
- B. Systolic ejection murmur with a musical quality
- C. Heard at the left lower sternal border and apex
- D. None of the above

154 Still's murmur increases in intensity with ?

N Engl J Med 2010;363:22

- A. Fever
- B. Anxiety
- C. Exercise
- D. All of the above

Most often seen in children, Still's murmur is a benign, medium-to-long systolic ejection murmur with a musical quality; it is heard at the left lower sternal border and apex. It increases in intensity with fever, anxiety, or exercise. Its cause is unknown.

155 Which of the following is true for holosystolic murmurs ?

Harrison's 17th Ed. 1386

- A. Begin before S1 and end before S2
- B. Begin after S1 and end before S2
- C. Begin with S1 and end with S2
- D. Begin with S1 and end after S2

Holosystolic murmurs (MR, TR, VSD) at the area of maximal intensity begin with S1 & end after S2.

156 Acute, severe MR occurs in ?

Harrison's 17th Ed. 1386

- A. Papillary muscle rupture in acute myocardial infarction

- B. Rupture of chordae tendineae in MVP
- C. Infective endocarditis
- D. All of the above

Clinical settings in which acute, severe MR occurs include papillary muscle rupture complicating acute MI, rupture of chordae tendineae in myxomatous mitral valve disease (MVP), infective endocarditis & blunt chest wall trauma.

157 Acute, severe MR from papillary muscle rupture accompanies which MI ?

Harrison's 17th Ed. 1386

- A. Inferior MI
- B. Posterior MI
- C. Lateral MI
- D. Any of the above

Acute, severe MR from papillary muscle rupture usually accompanies an inferior, posterior, or lateral MI and occurs 2 - 7 days after presentation.

158 Majority of heart murmurs are ?

Harrison's 17th Ed. 1386

- A. Early systolic
- B. Midsystolic
- C. Late systolic
- D. Holosystolic

Majority of heart murmurs are midsystolic and soft (grades I to II/VI).

159 Most benign, functional murmurs originate from ?

Harrison's 17th Ed. 1386

- A. Aortic outflow tract
- B. Pulmonary outflow tract
- C. Mitral valve
- D. Tricuspid valve

160 Most benign, functional murmurs are ?

Harrison's 17th Ed. 1386

- A. Presystolic
- B. Early systolic
- C. Midsystolic
- D. Late systolic

Most benign, functional murmurs are midsystolic and originate from the pulmonary outflow tract.

161 Systolic ejection murmur is the name given to ?

Harrison's 17th Ed. 1387

- A. Early systolic murmurs
- B. Midsystolic murmurs
- C. Late systolic murmurs
- D. Any of the above

Midsystolic murmurs are also called systolic ejection murmurs. They are crescendo-decrescendo in shape, occur across aortic or pulmonic outflow tracts. Murmur starts shortly after S1 and ends before the closure of aortic or pulmonic leaflets.

162 Auscultatory findings of severe AS include all except ?

Harrison's 17th Ed. 1386

- A. Soft or absent A₂
- B. Paradoxical splitting of S₂
- C. Apical S₄
- D. Early-peaking systolic murmur

Auscultatory findings of severe AS include a soft or absent A₂, paradoxical splitting of S₂, apical S₄ and a late-peaking systolic murmur.

163 Which of the following lesions produce midsystolic murmur with disproportionate radiation into right carotid artery ?

Harrison's 17th Ed. 1386

- A. Hypertrophic cardiomyopathy
- B. Valvular aortic stenosis
- C. Supravalvular aortic stenosis
- D. All of the above

164 Which of the following lesions produce midsystolic murmur with little radiation into carotid arteries ?

Harrison's 17th Ed. 1386

- A. Hypertrophic cardiomyopathy
- B. Valvular aortic stenosis
- C. Supravalvular aortic stenosis
- D. All of the above

In valvular AS, murmur is maximal in 2nd right ICS, with radiation into neck. In supravalvular AS, murmur radiates disproportionately into right carotid artery. In HOCM, midsystolic murmur originates in LV cavity & is maximal at lower left sternal edge & apex, with relatively little radiation to carotids.

165 Midsystolic murmur occurring in mitral regurgitation suggests ?

Harrison's 17th Ed. 1387

- A. Mitral valvulitis
- B. Papillary muscle dysfunction
- C. AV ring dilatation
- D. Mitral valve prolapse

Midsystolic murmur can occur in mitral regurgitation resulting from papillary muscle dysfunction.

166 Early systolic murmurs end in ?

Harrison's 17th Ed. 1386

- A. Early systole
- B. Midsystole
- C. Late systole
- D. Any of the above

167 Causes of early systolic murmurs include all except ?

Harrison's 17th Ed. 1386

- A. Large VSD with pulmonary hypertension
- B. Small muscular VSD
- C. TR with pulmonary hypertension
- D. Acute mitral regurgitation

Early systolic murmurs begin with S1 and end in midsystole. Examples include large VSD with pulmonary hypertension, small muscular VSD, TR without pulmonary hypertension and acute MR.

168 Late systolic murmurs are best heard at ?

Harrison's 17th Ed. 1386

- A. Apex
- B. Base
- C. Left parasternal
- D. Xiphoid

Late systolic murmurs high-pitched apical murmurs that start after S1 & do not mask S1 or S2.

169 Frequent cause of late systolic murmurs is ?

Harrison's 17th Ed. 1386

- A. Mitral valvulitis
- B. Papillary muscle dysfunction
- C. AV ring dilatation
- D. All of the above

Late systolic murmurs are frequently caused by papillary muscle dysfunction due to myocardial infarction or ischemia. MR in MVPS produces late systolic murmurs following midsystolic clicks.

170 Which of the following is false about early diastolic murmur of aortic regurgitation ?

Harrison's 16th Ed. 1310

- A. Low pitched
- B. Decrescendo
- C. Best heard over left midsternal border
- D. Best heard with patient sitting & leaning forward

Murmur of AR is high-pitched, decrescendo, best heard over left midsternal border when patient sits leaning forward & holds breath in full expiration.

171 Which of the following murmurs is low-pitched ?

Harrison's 17th Ed. 1386

- A. Aortic regurgitation
- B. Mitral regurgitation
- C. Mitral stenosis
- D. Pulmonic regurgitation due to pulmonary hypertension

Middiastolic murmur of mitral stenosis is low-pitched. Early diastolic murmurs of AR and PR due to pulmonary hypertension are high pitched. Holosystolic murmur of MR is high pitched.

172 By Doppler studies, trivial mitral regurgitation (MR) can be detected in what percentage of normal individuals ?

Harrison's 16th Ed. 1309

- A. 10 %
- B. 25 %
- C. 45 %
- D. 75 %

173 By Doppler studies, trivial tricuspid regurgitation (TR) can be detected in what percentage of normal individuals ?

Harrison's 16th Ed. 1309

- A. 10 %
- B. 25 %
- C. 45 %
- D. 70 %

174 By Doppler studies, trivial pulmonic regurgitation (PR) can be detected in what percentage of normal individuals ?

Harrison's 16th Ed. 1309

- A. 10 %
- B. 22 %
- C. 65 %
- D. 88 %

Trivial mitral regurgitation can be detected by 2D echocardiography & Doppler studies in ~ 45% of normal individuals, tricuspid regurgitation in ~ 70% and pulmonic regurgitation in ~ 88%.

175 By Doppler studies, which of the following is least detected in normal individuals ?

Harrison's 16th Ed. 1309

- A. Mitral regurgitation
- B. Tricuspid regurgitation

- C. Aortic regurgitation
- D. Pulmonic regurgitation

Aortic regurgitation is encountered much less frequently in normal persons, and its incidence increases with advancing age.

176 2D Echocardiography is always recommended in an asymptomatic person with which of the following murmur ?

Harrison's 16th Ed. 1303

- A. Holosystolic
- B. Diastolic
- C. Continuous
- D. All of the above

2D Doppler echocardiography is indicated in patients with loud systolic murmurs (grades $\geq$ III/VI), especially those that are holosystolic or late systolic & in those with diastolic or continuous murmurs.

177 In mitral stenosis, which of the following is more reliable as an index of severity of valve obstruction ?

Harrison's 16th Ed. 1310

- A. Loudness of S1
- B. Character of murmur
- C. Duration of murmur
- D. Intensity of murmur

In mitral stenosis, the duration of murmur is more reliable than its intensity as an index of the severity of valve obstruction.

178 Middiastolic murmurs may be generated across mitral valve by all except ?

Harrison's 16th Ed. 1310

- A. Mitral regurgitation
- B. Patent ductus arteriosus
- C. Atrial septal defect
- D. Ventricular septal defect

Middiastolic murmurs are generated across mitral valve in MR, PDA or VSD, and across the tricuspid valve in TR or ASD due to rapid flow across AV valve.

179 Which of the following statements about Carey-Coombs murmur is false ?

Harrison's 16th Ed. 1310, N Engl J Med 2010;363:22

- A. Soft
- B. Middiastolic murmur
- C. Heard in patients with acute rheumatic fever
- D. None of the above

Carey-Coombs murmur is a soft, middiastolic, low pitched murmur, heard best at the apex. It is heard in patients with acute rheumatic fever due to inflammation of mitral valve cusps. Carey Coombs murmur does not have an opening snap, presystolic accentuation, or a loud first sound, but may follow an S3 gallop.

180 Dock's murmur is best related to ?

N Engl J Med 2010;363:22

- A. Rupture of sinus of Valsalva
- B. Stenosis of the left anterior descending artery
- C. Pericarditis
- D. Endocarditis

Dock's murmur is due to stenosis of left anterior descending artery. It is likened to that of the bruits heard over stenosed renal and hepatic arteries. Dock's murmur is a continuous diastolic murmur, with a presystolic peak, a pattern consistent with blood flow through the coronary arteries. It may be in a sharply localized area, 4 cm left of the sternum in the third intercostal space, detectable only when the patient is sitting upright.

181 In sinus rhythm, presystolic murmur is most typical of ?*Harrison's 16th Ed. 1310*

- A. Aortic regurgitation
- B. Mitral regurgitation
- C. Tricuspid stenosis
- D. Aortic stenosis

Crescendo presystolic murmur follows atrial contraction that fills the ventricles in sinus rhythm in AV valve stenosis. It is most characteristic of tricuspid stenosis with sinus rhythm.

182 All of the following cause continuous murmur over precordium except ?*Harrison's 16th Ed. 1311*

- A. Mammary souffle
- B. Aortopulmonary septal defect
- C. Coarctation of aorta
- D. Proximal coronary artery stenosis

Continuous murmur in the "back" may be present in coarctation of the aorta.

183 All are true about cervical venous hum except ?*Harrison's 16th Ed. 1311*

- A. Audible in healthy children and young adults
- B. Audible in right supraclavicular fossa
- C. Abolished by compression over internal jugular vein
- D. Systolic louder than diastolic component

Cervical venous hum is a continuous murmur audible over medial aspect of right supraclavicular fossa with patient upright. It is louder during diastole and is abolished by digital compression of ipsilateral internal jugular vein.

184 All of the following are true about mammary souffle except ?*Harrison's 17th Ed. 1388*

- A. Represents augmented venous flow through engorged breasts
- B. Becomes audible during the late pregnancy
- C. Firm pressure with diaphragm of stethoscope can eliminate the diastolic portion of murmur
- D. Heard in second to sixth anterior intercostal spaces

"Mammary souffle" is an innocent murmur heard over breasts during late pregnancy and in early postpartum period. It may be systolic or continuous.

185 Transient external compression of both arms to levels above peak SBP augments murmurs of ?*Harrison's 16th Ed. 1307*

- A. MR
- B. VSD
- C. AR
- D. All of the above

Transient external compression of both arms by bilateral cuff inflation to 20 mm Hg over peak systolic pressure augments murmurs of MR, VSD & AR.

186 Roth's spots are a feature of ?*Harrison's 18th Ed. 230*

- A. Leukemia
- B. SLE
- C. Diabetes mellitus
- D. All of the above

Roth's spots are white centered retinal hemorrhages pathognomonic for subacute bacterial endocarditis. They also appear in leukemia & diabetes.

187 Which of the following statements about 'Means-Lerman scratch' is false ?*Harrison's 17th Ed. 1500*

- A. Systolic scratchy sound
- B. Heard best at left 2nd intercostal space in expiration
- C. Found in hypothyroidism
- D. Result from rubbing of pericardium against pleura

In hyperthyroid patients, a systolic pleuropericardial friction rub (Means-Lerman scratch) may be heard at left 2nd intercostal space during expiration due to hyperdynamic cardiac motion.

188 Which of the following is best heard with the diaphragm of a stethoscope ?

- A. S3
- B. S4
- C. Opening snap
- D. MS rumble

Low frequency sounds (S3, S4, MS rumble) are best heard with the bell applied lightly, whereas high frequency sounds (clicks, OS, MR) are best heard with the diaphragm.

189 A patient should be examined in the left lateral decubitus position to bring out findings at the apex of ?

- A. S3
- B. OS
- C. MS
- D. All of the above

Patient should be examined in the left lateral decubitus position to bring out findings at the apex of S3, OS and MS.

190 Top of the head is auscultated for ?

- A. Mitral regurgitation
- B. Aortic regurgitation
- C. Venous hum
- D. Right ventricular sounds

It is important to remember to auscultate areas such as left axilla and back (MR), subxiphoid (RV sounds), supraclavicular (venous hums), and top of the head (if AR is suspected).

191 Intensity of murmurs is described using which grading scale ?

- A. Lennaec
- B. Theodore
- C. Levine
- D. McCuine

Murmurs should be described by noting intensity, pitch, shape, quality, duration, and timing. The intensity of murmurs is described using the Levine grading scale. I/VI – heard only with special effort, II/VI – soft but easily detected, III/VI – prominent, IV/VI – loud with palpable thrill, V/VI – heard with edge of stethoscope head, palpable thrill and VI/VI – heard with stethoscope head removed from chest, palpable thrill.

192 Splitting of S1 may be due to ?

- A. RBBB
- B. Ebstein's anomaly
- C. Ventricular arrhythmias
- D. All of the above

Splitting of S1 may be normal or may be associated with RBBB, Ebstein's anomaly (due to abnormality of the tricuspid valve), or ventricular arrhythmias.

Chapter 228. Electrocardiography

193 ECG leads displays ?

Harrison's 18th Ed. 1831

- A. Instantaneous differences in electrical potential between electrodes
- B. Differences in electrical potential between electrode and neutral
- C. Differences in electrical potential between electrode & maximum positive charge
- D. Differences in electrical potential between electrode & maximum negative charge

ECG leads display instantaneous differences in potential between electrodes.

194 Electric currents that spread through the heart can be produced by ?

Harrison's 18th Ed. 1831

- A. Cardiac pacemaker cells
- B. Specialized conduction tissue
- C. Heart muscle
- D. All of the above

Depolarization of the heart is the initiating event for cardiac contraction. The electric currents that spread through the heart are produced by cardiac pacemaker cells, specialized conduction tissue, and heart muscle. The ECG records only the depolarization (stimulation) and repolarization (recovery) potentials generated by the atrial and ventricular myocardium.

195 AV junction is constituted by ?

Harrison's 18th Ed. 1831

- A. Atrioventricular (AV) node
- B. AV node and His-bundle
- C. AV node, His-bundle and fascicles
- D. AV node, His-bundle, fascicles & Purkinje fibres

AV nodal region & His-bundle area together constitute AV junction.

196 Ventricular repolarization is represented by ?

Harrison's 18th Ed. 1831

- A. ST segment
- B. T wave
- C. U wave
- D. ST-T-U complex

QRS complex represents ventricular depolarization & ST-T-U complex (ST segment, T wave & U wave) represents ventricular repolarization.

197 J point is the junction between ?

Harrison's 18th Ed. 1831

- A. End of P wave & beginning of QRS complex
- B. End of QRS complex & beginning of ST segment
- C. End of ST segment & beginning of T wave
- D. End of T wave & beginning of U wave

J point is the junction between the end of QRS complex and the beginning of ST segment.

198 Atrial repolarization wave may become apparent in ?

Harrison's 18th Ed. 1831

- A. Acute pericarditis
- B. Cardiomyopathy

- C. PSVT
- D. Wandering pacemaker

199 Atrial repolarization wave may become apparent in ?

Harrison's 18th Ed. 1831

- A. Acute rheumatic fever
- B. Cardiomyopathy
- C. PSVT
- D. Atrial infarction

Atrial repolarization is usually too low in amplitude to be detected, but it may become apparent in acute pericarditis or atrial infarction.

200 Rapid upstroke of the action potential that corresponds to the onset of QRS is called ?

Harrison's 18th Ed. 1831

- A. Phase 0
- B. Phase 1
- C. Phase 2
- D. Phase 3

201 Plateau of the action potential that corresponds to isoelectric ST segment is called ?

Harrison's 18th Ed. 1831

- A. Phase 0
- B. Phase 1
- C. Phase 2
- D. Phase 3

The QRS-T waveforms of the surface ECG correspond with the different phases of simultaneously obtained ventricular action potentials. Rapid upstroke (phase 0) of the action potential corresponds to the onset of QRS. Plateau (phase 2) corresponds to the isoelectric ST segment, and active repolarization (phase 3) corresponds to the inscription of the T wave.

202 Which of the following prolong phase 2 of the cardiac muscle action potential and increase the QT interval ?

Harrison's 18th Ed. 1831

- A. Hyperkalemia
- B. Amiodarone
- C. Digitalis
- D. Hypercalcemia

Factors that decrease slope of phase 0 by impairing influx of Na⁺ (hyperkalemia & flecainide) tend to increase QRS duration. Conditions that prolong phase 2 (amiodarone, hypocalcemia) increase QT interval. Shortening of ventricular repolarization (phase 2) by digitalis administration or hypercalcemia, abbreviates ST segment.

203 The action potential of the His-Purkinje system and ventricular myocardium has ?

Harrison's 16th Ed. 1333

- A. Two phases
- B. Three phases
- C. Four phases
- D. Five phases

Action potential of the His-Purkinje system has five phases.

204 Resting membrane potential in ventricular myocardium is ?

Harrison's 16th Ed. 1333

- A. Phase 1
- B. Phase 2

- C. Phase 3
- D. Phase 4

Rapid depolarizing current (phase 0) is due to influx of Na^+ into myocardial cells followed by influx of Ca^{++} . Repolarization phases of action potential (phases 1 to 3) are due to outward flux of K^+ . Resting membrane potential is phase 4.

205 Automaticity is normally observed in ?

Harrison's 16th Ed. 1334

- A. Sinus node
- B. Specialized fibers of His-Purkinje system
- C. Some specialized atrial fibers
- D. All of the above

Automaticity is normally observed in sinus node, specialized fibers of His-Purkinje system & some specialized atrial fibers. It is the property of a cardiac cell that causes it to depolarize spontaneously during phase 4 of the action potential leading to the generation of an impulse.

206 Polarized resting myocardial cells carry an electric charge on their surface of about ?

Harrison's 16th Ed. 1312

- A. 70 mV
- B. 80 mV
- C. 90 mV
- D. 100 mV

207 PR interval is related to ?

Harrison's 18th Ed. 1832

- A. Atrial musculature conduction
- B. AV node
- C. AV junction area
- D. All of the above

PR interval measures the time (normally 120 - 200 ms) between atrial & ventricular depolarization, which includes the physiologic delay imposed by stimulation of cells in the AV junction area.

208 Extremity ECG leads record potentials transmitted onto ?

Harrison's 18th Ed. 1832

- A. Frontal plane
- B. Vertical plane
- C. Horizontal plane
- D. Diagonal plane

209 ECG chest leads record potentials transmitted onto ?

Harrison's 18th Ed. 1832

- A. Frontal plane
- B. Vertical plane
- C. Horizontal plane
- D. Diagonal plane

Six extremity leads record potentials transmitted onto the frontal plane & the six chest leads record potentials transmitted onto the horizontal plane.

210 ECG Lead V_6 is placed at ?

Harrison's 18th Ed. 1832

- A. Anterior axillary line
- B. Midaxillary line
- C. Posterior axillary line
- D. Scapular line

Positions of six unipolar chest leads are : V_1 = IV ICS just to the right of sternum, V_2 = IV ICS,

just to the left of sternum, V_3 = midway between V_2 and V_4 , V_4 = V ICS midclavicular line, V_5 = V ICS anterior axillary line, V_6 = V ICS midaxillary line.

211 Number of intercostal spaces used for placing unipolar chest leads in ECG are ?

Harrison's 18th Ed. 1832

- A. 1
- B. 2
- C. 3
- D. 4

IV and V intercostal spaces.

212 In the hexaxial diagram representing frontal plane (limb or extremity) leads, 0° corresponds to which lead ?

Harrison's 18th Ed. 1832, Figure 228-4

- A. Lead I
- B. Lead II
- C. Lead III
- D. Any of the above

Each lead axis is designated by their angular position relative to the positive pole of lead I (0°).

213 In ECG, if the mean orientation of the depolarization vector is at right angles to a given lead axis, which of the following will happen ?

Harrison's 18th Ed. 1832

- A. Positive wave will be recorded
- B. Negative wave will be recorded
- C. Biphasic wave will be recorded
- D. Flat wave will be recorded

ECG leads are configured so that a positive (upright) deflection is recorded in a lead if a wave of depolarization spreads toward the positive pole of that lead, and a negative deflection if the wave spreads toward the negative pole. If the mean orientation of depolarization vector is at right angles to a given lead axis, a biphasic (equally positive & negative) deflection is recorded.

214 ECG leads I, II, and III are called ?

Harrison's 17th Ed. 1389

- A. Unipolar leads
- B. Bipolar leads
- C. Tripolar leads
- D. Multipolar leads

215 ECG leads aVR, aVL, and aVF are called ?

Harrison's 17th Ed. 1389

- A. Unipolar leads
- B. Bipolar leads
- C. Tripolar leads
- D. Multipolar leads

Six extremity leads are 3 bipolar leads (I, II & III) and 3 unipolar leads (aVR, aVL & aVF) leads. Each bipolar lead measures the difference in potential between electrodes at two extremities.

216 Bipolar lead I measures the difference in potential between ?

Harrison's 17th Ed. 1389

- A. Left arm-right arm voltages
- B. Left leg-right arm voltages
- C. Left leg-left arm voltages
- D. Left leg-right leg voltages

217 Bipolar lead II measures the difference in potential between ?*Harrison's 17th Ed. 1389*

- A. Left arm-right arm voltages
- B. Left leg-right arm voltages
- C. Left leg-left arm voltages
- D. Left leg-right leg voltages

218 Bipolar lead III measures the difference in potential between ?*Harrison's 17th Ed. 1389*

- A. Left arm-right arm voltages
- B. Left leg-right arm voltages
- C. Left leg-left arm voltages
- D. Left leg-right leg voltages

Each bipolar lead measures the difference in potential between electrodes at two extremities: lead I = left arm-right arm voltages, lead II = left leg-right arm, and lead III = left leg-left arm.

219 In unipolar leads, the lowercase "a" stands for ?*Harrison's 17th Ed. 1389*

- A. Added
- B. Augmented
- C. Arithmetic
- D. Apparent

220 Electrical augmentation of unipolar potentials in unipolar leads is by ?*Harrison's 17th Ed. 1389*

- A. 25 %
- B. 50 %
- C. 75 %
- D. 100 %

The lowercase "a" indicates that these unipolar potentials are electrically augmented by 50%. The right leg electrode functions as a ground. Unipolar leads measure the voltage at one locus relative to an electrode (called central terminal or indifferent electrode) that has approximately zero potential. Thus, aVR = right arm, aVL = left arm, and aVF = left leg.

221 The normal atrial depolarization vector is oriented ?*Harrison's 18th Ed. 1832*

- A. Downward and toward left
- B. Upward and toward left
- C. Downward and toward right
- D. Upward and toward right

Normal atrial depolarization vector (P wave) is oriented downward & toward left, indicating spread of depolarization from sinus node to right & then left atrial myocardium. Since this vector points toward the negative pole of lead aVR, normal P wave will be negative in aVR. Opposite will occur if an ectopic pacemaker is in the lower part of either atrium or in the AV junction region.

222 QRS vector 1 points towards ?*Harrison's 18th Ed. 1833, Figure 228-6*

- A. Leftward and posteriorly
- B. Leftward and anteriorly
- C. Rightward and posteriorly
- D. Rightward and anteriorly

223 QRS vector 2 points towards ?*Harrison's 18th Ed. 1833, Figure 228-6*

- A. Leftward and posteriorly
- B. Leftward and anteriorly

C. Rightward and posteriorly

D. Rightward and anteriorly

QRS complex represents depolarization of ventricles. Its first phase (vector 1) is depolarization of interventricular septum from left to right & anteriorly. Second phase (vector 2) results from the simultaneous depolarization of right & left ventricles that points leftward & posteriorly due to the more massive left ventricle.

224 Above what degree of QRS axis is left axis deviation defined ?*Harrison's 18th Ed. 1834*

- A. -10°
- B. -20°
- C. -30°
- D. -40°

225 Above what degree of QRS axis is called right axis deviation ?*Harrison's 18th Ed. 1834*

- A. $+80^\circ$
- B. $+90^\circ$
- C. $+100^\circ$
- D. $+110^\circ$

Normally, the QRS axis ranges from -30° to $+100^\circ$. QRS axis more negative than -30° is referred to as left axis deviation, while an axis more positive than $+100^\circ$ is referred to as right axis deviation.

226 Left axis deviation occurs in ?*Harrison's 18th Ed. 1834*

- A. As a normal variant
- B. Left ventricular hypertrophy
- C. Inferior myocardial infarction
- D. All of the above

Left axis deviation may occur as a normal variant but is more commonly associated with left ventricular hypertrophy, left anterior fascicular hemiblock, or inferior myocardial infarction.

227 Right axis deviation occurs in ?*Harrison's 18th Ed. 1834*

- A. Due to reversal of left and right arm electrodes
- B. Right ventricular overload
- C. Infarction of lateral wall of left ventricle
- D. All of the above

228 Right axis deviation (RAD) occurs in ?*Harrison's 18th Ed. 1834*

- A. Dextrocardia
- B. Left pneumothorax
- C. Left posterior hemiblock
- D. All of the above

RAD may occur as a normal variant (in children & young adults), as a spurious finding due to reversal of left & right arm electrodes, or in right ventricular overload (acute or chronic), infarction of lateral wall of left ventricle, dextrocardia, left pneumothorax or left posterior fascicular block.

229 An abnormal increase in U-wave amplitude is due to which of the following drugs ?*Harrison's 18th Ed. 1834*

- A. Quinidine
- B. Procainamide
- C. Disopyramide
- D. All of the above

- 230 An abnormal increase in U-wave amplitude is due which of the following electrolyte disturbance ?**

Harrison's 18th Ed. 1834

- A. Hyponatremia
- B. Hyperkalemia
- C. Hypokalemia
- D. All of the above

Abnormal increase in U-wave amplitude is mostly due to hypokalemia or drugs like dofetilide, amiodarone, sotalol, quinidine, procainamide, disopyramide.

- 231 Very prominent U waves are a marker of increased susceptibility to which of the following ?**

Harrison's 18th Ed. 1834

- A. Torsades de pointes (TDP)
- B. AIVR
- C. Ventricular flutter
- D. Any of the above

Very prominent U waves are a marker of increased susceptibility to TDP type of ventricular tachycardia. Inversion of U wave in precordial leads is abnormal & may be a subtle sign of ischemia.

- 232 P wave amplitude of how many millimeter suggests right atrial overload ?**

Harrison's 18th Ed. 1834

- A. ≥ 1.0 mm
- B. ≥ 1.5 mm
- C. ≥ 2.0 mm
- D. ≥ 2.5 mm

Right atrial overload (acute or chronic) may lead to an increase in P wave amplitude (≥ 2.5 mm).

- 233 Ventricular "strain" pattern is due to which abnormality in hypertrophied muscle ?**

Harrison's 18th Ed. 1834

- A. Depolarization
- B. Repolarization
- C. Repolarization & depolarization
- D. None of the above

Ventricular "strain" pattern is due to repolarization abnormalities in hypertrophied muscle.

- 234 Which of the following is not a common feature in right ventricular hypertrophy due to pressure load ?**

Harrison's 18th Ed. 1834

- A. $R \geq S$ wave in lead V1
- B. Right axis deviation
- C. Incomplete or complete right bundle branch block pattern
- D. ST depression, T-wave inversion in (R) to midprecordial leads

RVH due to a pressure load (PS, PHT) is characterized by tall R wave in lead V1 ($R > S$ wave), with right axis deviation. ST depression and T-wave inversion in right to midprecordial leads are also often present (ventricular strain pattern). Right ventricular hypertrophy with right ventricular volume overload (ostium secundum ASD) is commonly associated with incomplete or complete right bundle branch block pattern with a rightward QRS axis.

- 235 In acute cor pulmonale due to pulmonary embolism, which of the following is the most common arrhythmia ?**

Harrison's 18th Ed. 1834

- A. Sinus tachycardia
- B. Atrial fibrillation

- C. Atrial flutter
- D. PSVT

Acute cor pulmonale due to pulmonary embolism may be associated with a normal ECG. Sinus tachycardia is the most common arrhythmia. Atrial fibrillation or flutter may occur.

- 236 $S_1Q_3T_3$ pattern is seen in ?**

Harrison's 18th Ed. 1834

- A. Acute cor pulmonale due to pulmonary embolism
- B. Right bundle branch block
- C. Severe mitral stenosis
- D. Acute dissection of aorta

$S_1Q_3T_3$ pattern i.e. prominence of S wave in lead I, Q wave in lead III, T-wave inversion in lead III, is seen in acute cor pulmonale due to pulmonary embolism.

- 237 Poor R-wave progression seen in chronic cor pulmonale due to obstructive lung disease is due to ?**

Harrison's 18th Ed. 1835

- A. Hyperaeration of lungs
- B. Downward displacement of diaphragm and heart
- C. Myocardial ischemia
- D. All of the above

Poor R-wave progression is noted in chronic cor pulmonale due to obstructive lung disease despite right ventricular hypertrophy. This is due to downward displacement of diaphragm and heart. Low-voltage complexes are commonly present, owing to hyperaeration of the lungs.

- 238 In ECG, $SV_1 + (RV_5 \text{ or } RV_6) \geq 35$ mm or $(RV_5 \text{ or } RV_6) \geq 25$ mm indicates ?**

Harrison's 18th Ed. 1835

- A. Right ventricular hypertrophy
- B. Left ventricular hypertrophy
- C. Biventricular hypertrophy
- D. None of the above

$SV_1 + (RV_5 \text{ or } RV_6) \geq 35$ mm or $(RV_5 \text{ or } RV_6) \geq 25$ mm indicate LVH by voltage criteria.

- 239 In ECG, $RaVL \geq 11$ to 13 mm, $RaVF \geq 20$ mm or $R_1 + S_{III} \geq 25$ mm indicates ?**

Harrison's 18th Ed. 1835

- A. Right ventricular hypertrophy
- B. Left ventricular hypertrophy
- C. Biventricular hypertrophy
- D. None of the above

$RaVL \geq 11$ to 13 mm, $RaVF \geq 20$ mm, $R_1 + S_{III} \geq 25$ mm, with or without increased precordial voltage, indicates left ventricular hypertrophy.

- 240 Which of the following statements about left ventricular hypertrophy (LVH) is false ?**

Harrison's 18th Ed. 1835

- A. Left atrial abnormality increases likelihood of underlying LVH
- B. LVH often progresses to incomplete or complete LBBB
- C. Sensitivity of conventional voltage criteria for LVH is decreased in thin persons
- D. ECG evidence of LVH is a marker of sudden cardiac death

Presence of left atrial abnormality increases the likelihood of underlying LVH. LVH often progresses to incomplete or complete LBBB. Sensitivity of conventional voltage criteria for LVH is decreased in obese persons & in smokers. ECG evidence for LVH is a major noninvasive marker of increased risk of cardiovascular morbidity & mortality, including sudden cardiac death.

241 Which of the following about bundle branches is true ?

Harrison's 16th Ed. 1333

- A. Left is narrow & cable-like, right is a broad sheet of fibers
- B. Left is a broad sheet of fibers & right is narrow & cable-like
- C. Left & right bundle branches are broad sheets of fibers
- D. Left & right bundle branches are narrow & cable-like

Bundle of His gives rise to a broad sheet of fibers that course over the left side of interventricular septum to form left bundle branch & a narrow cable-like structure on the right side that forms the right bundle branch.

242 With complete bundle branch blocks the QRS interval is ?

Harrison's 18th Ed. 1835

- A. ≥ 90 ms in duration
- B. ≥ 100 ms in duration
- C. ≥ 110 ms in duration
- D. ≥ 120 ms in duration

With complete bundle branch blocks the QRS interval is ≥ 120 ms in duration. With incomplete blocks, the QRS interval is between 100 and 120 ms.

243 In RBBB, the terminal QRS vector is oriented ?

Harrison's 18th Ed. 1835

- A. Anteriorly and to right
- B. Anteriorly and to left
- C. Posteriorly and to right
- D. Posteriorly and to left

In bundle branch blocks, QRS vector is oriented in the direction of myocardial region where depolarization is delayed. In RBBB, the terminal QRS vector is oriented anteriorly and to the right (rSR' in V1 & qRS in V6).

244 In LBBB, the major QRS vector is oriented ?

Harrison's 18th Ed. 1835

- A. Anteriorly and to right
- B. Anteriorly and to left
- C. Posteriorly and to right
- D. Posteriorly and to left

LBBB alters both early & later phases of ventricular depolarization. Major QRS vector is directed to left & posteriorly. Normal early left to right pattern of septal activation is disrupted so septal depolarization proceeds from right to left. LBBB has wide, predominantly negative (QS) complexes in lead V1 & entirely positive (R) complexes in lead V6. A pattern identical to that of LBBB, preceded by a sharp spike, is seen in cases of electronic right ventricular pacing because of the relative delay in left ventricular activation.

245 Which of the following about bundle branch blocks is false ?

Harrison's 18th Ed. 1835

- A. Without structural heart disease, LBBB is more common than RBBB
- B. Bundle branch blocks may be chronic or intermittent
- C. Bundle branch block may be rate-related
- D. LBBB pattern is seen in electronic right ventricular pacing

In subjects without structural heart disease, RBBB is seen more commonly than LBBB.

246 Left bundle branch block is often a marker of ?

Harrison's 18th Ed. 1835

- A. Ischemic heart disease
- B. Severe aortic valve disease
- C. Cardiomyopathy
- D. All of the above

LBBB is a marker of increased risk of cardiovascular morbidity & mortality (coronary heart disease, hypertensive heart disease, aortic valve disease, and cardiomyopathy).

247 Examples of bifascicular block include ?

Harrison's 18th Ed. 1835

- A. RBBB and LPHB
- B. RBBB with LAHB
- C. Complete LBBB
- D. All of the above

248 Alternation of right & left bundle branch block is a sign of ?

Harrison's 18th Ed. 1835

- A. Bifascicular disease
- B. Trifascicular disease
- C. Complete heart block
- D. AV Dissociation

Alternation of RBBB & LBBB is a sign of trifascicular disease.

249 Intraventricular conduction delays can be caused by ?

Harrison's 18th Ed. 1835

- A. Hyperkalemia
- B. Tricyclic antidepressants
- C. Phenothiazines
- D. All of the above

Intraventricular conduction delays can be caused by toxic factors that slow ventricular conduction (hyperkalemia, class 1 antiarrhythmic agents, tricyclic antidepressants, phenothiazines).

250 Which of the following is diagnostic of Wolff-Parkinson-White syndrome ?

Harrison's 18th Ed. 1836

- A. Wide QRS complex
- B. Relatively short PR interval
- C. Slurring of initial part of QRS (delta wave)
- D. All of the above

Prolongation of QRS duration does not necessarily indicate a conduction delay but may be due to a form of ventricular preexcitation via a bypass tract, Wolff-Parkinson-White (WPW) syndrome is diagnosed by a triad consisting of a wide QRS complex associated with a relatively short PR interval and slurring of the initial part of the QRS (delta wave), with the latter effect being due to aberrant activation of ventricular myocardium.

251 Which of the following about myocardial ischemia is false ?

Harrison's 18th Ed. 1836

- A. Complex time-dependent effects on electrical properties of myocardial cells
- B. Severe, acute ischemia lengthens duration of action potential
- C. Cause a voltage gradient between normal & ischemic zones
- D. Leads to flow of currents of injury

Severe, acute ischemia lowers the resting membrane potential & shortens duration of action potential.

252 Wellens T waves are usually associated with ?

Harrison's 18th Ed. 1836, Figure 228-12

- A. Stenosis of left anterior descending coronary artery
- B. Stenosis of posterior descending coronary artery
- C. Stenosis of left circumflex coronary artery
- D. Stenosis of right coronary artery

Severe anterior wall ischemia (with or without infarction) may cause prominent T-wave inversions in the precordial leads. This pattern referred to as Wellens T waves is usually associated with a high-grade stenosis of the left anterior descending coronary artery.

253 Atrial infarction may be associated with ?

Harrison's 18th Ed. 1837

- A PR-segment deviations
- B. Changes in P-wave morphology
- C. Atrial arrhythmias
- D. All of the above

Atrial infarction may be associated with PR-segment deviations due to an atrial current of injury, changes in P-wave morphology, or atrial arrhythmias.

254 Diagnostic changes of acute or evolving ischemia are masked by ?

Harrison's 18th Ed. 1837

- A Left bundle branch block
- B. Electronic ventricular pacemaker patterns
- C. WPW preexcitation
- D. All of the above

Diagnostic changes of acute or evolving ischemia can be masked by presence of LBBB, electronic ventricular pacemaker patterns & WPW preexcitation.

255 Osborn wave in ECG is found in ?

Harrison's 18th Ed. 1838, Table 228-1

- A Heat stroke
- B. Hypothermia
- C. Cerebrovascular accident
- D. Pneumothorax

Systemic hypothermia also prolongs repolarization, usually with a distinctive convex elevation or "hump" at the J point referred to as Osborn wave. It is due to altered ventricular action potential characteristics.

256 ST-segment elevations simulating ischemia may occur with ?

Harrison's 18th Ed. 1838, Table 228-1

- A Hypercalcemia
- B. Hyperkalemia
- C. Hypothermia
- D. All of the above

257 ST-segment elevations simulating ischemia may occur with ?

Harrison's 18th Ed. 1838, Table 228-1

- A Acute pericarditis
- B. Myocarditis
- C. Brugada syndrome
- D. All of the above

258 Tall, positive T waves are seen in ?

Harrison's 18th Ed. 1837

- A Hyperkalemia
- B. Cerebrovascular injury
- C. Left ventricular volume overload (MR or AR)
- D. All of the above

Tall, positive T waves may be seen in hyperacute ischemic changes, normal variants, hyperkalemia, cerebrovascular injury & left ventricular volume overload due to mitral or aortic regurgitation.

259 The first ECG change in hyperkalemia is ?

Harrison's 18th Ed. 1838

- A Diminution in P-wave amplitude
- B. Narrowing & peaking (tenting) of T waves
- C. Widening of QRS interval
- D. AV conduction disturbances

ECG changes in hyperkalemia usually begin with narrowing and peaking (tenting) of the T waves. Further elevation of extracellular K⁺ leads to AV conduction disturbances, diminution in P-wave amplitude, and widening of the QRS interval. Severe hyperkalemia causes a slow sinusoidal type of mechanism ("sine-wave" pattern) followed by asystole.

260 ECG changes in hypertrophic cardiomyopathy may simulate ?

Harrison's 17th Ed. 1395 Table 221-2

- A Anterior MI
- B. Lateral MI
- C. Inferior MI
- D. All of the above

261 QRS & QT prolongation along with sinus tachycardia can be seen in ?

Harrison's 18th Ed. 1839, Figure 228-16

- A Tricyclic antidepressant overdose
- B. Quinidine excess
- C. Subarachnoid hemorrhage
- D. Hyperkalemia

Drugs that prolong QT are quinidine, disopyramide, procainamide, tricyclic antidepressants, phenothiazines, amiodarone, sotalol, ibutilide. QRS & QT prolongation along with sinus tachycardia occur in tricyclic antidepressant overdose.

262 "CVA T-wave" pattern consists of all except ?

Harrison's 18th Ed. 1838

- A Marked QT prolongation
- B. Marked PR prolongation
- C. Deep T-wave inversions
- D. Wide T-wave inversions

Marked QT prolongation, with deep & wide T-wave inversions occur with intracranial bleeds, particularly subarachnoid hemorrhage and are called as "CVA T-wave" pattern.

263 Systemic hypothermia prolongs ?

Harrison's 18th Ed. 1838

- A Depolarization
- B. Repolarization
- C. Depolarization + repolarization
- D. None of the above

Systemic hypothermia also prolongs repolarization with a distinctive convex elevation of the J point called Osborn wave.

264 Which of the following prolongs the QT interval ?

Harrison's 18th Ed. 1838

- A Hypothermia
- B. Hypokalemia
- C. Hypocalcemia
- D. All of the above

265 Abbreviation of ST segment and shortening of QT interval is found in ?

Harrison's 18th Ed. 1838

- A Hypocalcemia

- B. Hypercalcemia
- C. Hyponatremia
- D. Hyperkalemia

Hypocalcemia typically prolongs the QT interval (ST portion), while hypercalcemia shortens it.

266 Which of the following shortens the QT interval ?

Harrison's 18th Ed. 1838

- A. Digitalis
- B. Disopyramide
- C. Ibutilide
- D. Procainamide

Digitalis glycosides also shorten the QT interval, often with a characteristic "scooping" of the ST-T-wave complex (digitalis effect).

267 Q waves in ECG can be seen in all of the following except ?

Harrison's 17th Ed. 1395 Table 221-2

- A. Sarcoidosis
- B. Scleroderma
- C. SLE
- D. Chagas' disease

268 Q waves in ECG can be seen in all of the following except ?

Harrison's 17th Ed. 1395 Table 221-2

- A. Left pneumothorax
- B. Dextrocardia
- C. Long QT syndrome
- D. Wolff-Parkinson-White syndrome

269 In ECG, transient nonspecific repolarization changes occur following all except ?

Harrison's 18th Ed. 1838

- A. Meals
- B. Postural (orthostatic) change
- C. Hyperventilation
- D. Sleep

Transient nonspecific nonspecific ST-T-wave repolarization changes may occur following a meal or with postural (orthostatic) change, hyperventilation, or exercise in healthy individuals.

270 In ECG, total electrical alternans (P-QRS-T) with sinus tachycardia is a relatively specific sign of ?

Harrison's 18th Ed. 1839

- A. Myocardial ischemia
- B. Myocarditis
- C. Pericardial effusion
- D. Pneumothorax

Total electrical alternans (P-QRS-T) with sinus tachycardia (beat-to-beat alternation in one or more components of ECG) is a relatively specific sign of pericardial effusion with cardiac tamponade due to periodic swinging motion of heart in effusion at a frequency exactly half of heart rate.

271 Repolarization (ST-T or U wave) alternans is a sign of ?

Harrison's 18th Ed. 1839

- A. Mechanical instability of heart
- B. Electrical instability of heart
- C. Serious pulmonary disease
- D. Serious hepatic disease

Repolarization (ST-T or U wave) alternans is a sign of electrical instability & may precede ventricular tachyarrhythmias.

272 Chronic renal failure (CRF) is suspected if ECG shows ?

Harrison's 18th Ed. 1839

- A. Peaked T waves
- B. Long QT
- C. Left ventricular hypertrophy (LVH)
- D. All of the above

CRF can have the following ECG features as a triad - peaked T waves (hyperkalemia), long QT due to ST segment lengthening (hypocalcemia) & LVH (systemic hypertension).

273 "Persistent juvenile T-wave pattern" consists of ?

Harrison's 17th Ed. 1396

- A. T-wave inversions in leads $V_1 - V_3$
- B. T-wave inversions in leads $V_1 - V_4$
- C. T-wave inversions in leads $V_1 - V_5$
- D. T-wave inversions in leads $V_1 - V_6$

"Persistent juvenile T-wave pattern" a normal variant in healthy young adult woman consisting of T-wave inversions in leads $V_1 - V_3$.

Chapter 229. Noninvasive Cardiac Imaging: Echocardiography, Nuclear Cardiology, and MRI/CT Imaging

274 In color flow Doppler imaging of heart, which colour represents blood flow towards the transducer ?

Harrison's 16th Ed. 1321

- A. Blue
- B. Red
- C. Yellow
- D. Green

275 In color flow Doppler imaging of heart, which colour represents blood flow away from the transducer ?

Harrison's 16th Ed. 1321

- A. Blue
- B. Red
- C. Yellow
- D. Green

276 In color flow Doppler imaging of heart, which colour represents turbulent blood flow ?

Harrison's 16th Ed. 1321

- A. Blue
- B. Red
- C. Yellow
- D. Green

277 How should a continuous-wave Doppler beam be placed to determine mean gradient across a stenotic cardiac valve ?

Harrison's 16th Ed. 1322

- A. Parallel to the jet
- B. Perpendicular to the jet
- C. Tangential to the jet
- D. All of the above

278 During a stress echocardiogram, indicators of myocardial ischemia include ?

Harrison's 16th Ed. 1322

- A. New regional wall motion abnormality
- B. Decline in ejection fraction
- C. Increase in end-systolic volume
- D. All of the above

279 To assess mitral and aortic valves, left ventriculography is usually performed in which projection ?

Harrison's 16th Ed. 1331

- A. Left anterior oblique projection
- B. Right anterior oblique projection
- C. Antero-posterior projection
- D. Postero-anterior projection

Chapter 230. Diagnostic Cardiac Catheterization and Coronary Angiography

280 Risk of death from elective cardiac catheterization is about ?

Harrison's 17th Ed. 1405

- A. 1 in 1000
- B. 1 in 5,000
- C. 1 in 10,000
- D. 1 in 100,000

Risk of death from elective cardiac catheterization is ~1 in 10,000 (0.01%).

281 Risk of stroke, MI, transient tachy- or bradyarrhythmias from elective cardiac catheterization is about ?

Harrison's 17th Ed. 1405

- A. 1 in 1000
- B. 1 in 5,000
- C. 1 in 10,000
- D. 1 in 100,000

Elective cardiac catheterization carry a ~1 in 1000 risk of stroke or MI, transient tachy- or bradyarrhythmias, or bruising or bleeding at the catheter insertion site.

282 Transient deterioration in renal function in patients undergoing cardiac catheterization is reduced by ?

Harrison's 17th Ed. 1405

- A. Adequate prehydration
- B. Preprocedure N-acetylcysteine
- C. Use of isoosmolar contrast agent
- D. All of the above

Transient deterioration in renal function in patients undergoing cardiac catheterization is reduced by adequate prehydration, preprocedure N-acetylcysteine, or use of an isoosmolar contrast agent.

283 Which of the following is recommended in those undergoing diagnostic catheterization for suspected coronary disease ?

Harrison's 17th Ed. 1405

- A. Warfarin
- B. Prophylactic antibiotics

- C. Oral aspirin
- D. All of the above

Chronically anticoagulated patients with warfarin should discontinue it at least 48 hours prior to procedure (INR <2). Oral aspirin (325 mg/day) is given to patients undergoing diagnostic catheterization for suspected coronary disease, since aspirin pretreatment is desired if a coronary intervention is to be performed. As cardiac catheterization is a sterile procedure, prophylactic antibiotics are not necessary.

284 Pulmonary wedge pressure approximates which of the following pressures ?

Harrison's 17th Ed. 1406

- A. Right atrial
- B. Left atrial
- C. Right ventricular
- D. Left ventricular

Pulmonary wedge pressure approximates left atrial pressure.

285 Normal value of systemic arterial peak systolic / end-diastolic pressure is ?

Harrison's 17th Ed. 1406, Table 223-1

- A. 90 - 110 / 60 - 90 mmHg
- B. 100 - 140 / 60 - 90 mmHg
- C. 130 - 160 / 60 - 90 mmHg
- D. 140 - 160 / 60 - 90 mmHg

286 Normal value of mean systemic arterial pressure is ?

Harrison's 17th Ed. 1406, Table 223-1

- A. 50 - 90 mm Hg
- B. 60 - 100 mm Hg
- C. 70 - 105 mm Hg
- D. 80 - 110 mm Hg

287 Normal value of left ventricular peak systolic / end-diastolic pressure is ?

Harrison's 17th Ed. 1406, Table 223-1

- A. 100 - 140 / 0 - 3 mm Hg
- B. 100 - 140 / 1 - 5 mm Hg
- C. 100 - 140 / 2 - 8 mm Hg
- D. 100 - 140 / 3 - 12 mm Hg

288 Normal value of mean left atrial or pulmonary capillary wedge pressure is ?

Harrison's 17th Ed. 1406, Table 223-1

- A. 2 - 10 mm Hg
- B. 4 - 15 mm Hg
- C. 6 - 20 mm Hg
- D. 8 - 25 mm Hg

289 Normal value of "a" wave left atrial pressure is ?

Harrison's 17th Ed. 1406, Table 223-1

- A. 1 - 5 mm Hg
- B. 2 - 10 mm Hg
- C. 3 - 15 mm Hg
- D. 4 - 20 mm Hg

290 Normal value of "v" wave left atrial pressure is ?

Harrison's 17th Ed. 1406, Table 223-1

- A. 1 - 5 mm Hg

- B. 2 - 10 mm Hg
C. 3 - 15 mm Hg
D. 4 - 20 mm Hg
- 291 Normal value of pulmonary artery peak systolic / end-diastolic pressure is ?**
Harrison's 17th Ed. 1406, Table 223-1
A. 5 - 8 / 4 - 12 mmHg
B. 10 - 20 / 4 - 12 mmHg
C. 15 - 30 / 4 - 12 mmHg
D. 20 - 40 / 4 - 12 mmHg
- 292 Normal value of mean pulmonary artery pressure is ?**
Harrison's 17th Ed. 1406, Table 223-1
A. 5 - 12 mm Hg
B. 7 - 15 mm Hg
C. 9 - 18 mm Hg
D. 11 - 22 mm Hg
- 293 Normal value of right ventricular peak systolic / end-diastolic pressure is ?**
Harrison's 17th Ed. 1406, Table 223-1
A. 10 - 20 / 2 - 8 mmHg
B. 15 - 30 / 2 - 8 mmHg
C. 20 - 40 / 2 - 8 mmHg
D. 25 - 50 / 2 - 8 mmHg
- 294 Normal value of mean right atrial pressure is ?**
Harrison's 17th Ed. 1406, Table 223-1
A. 2 - 4 mm Hg
B. 2 - 6 mm Hg
C. 2 - 8 mm Hg
D. 2 - 10 mm Hg
- 295 Normal value of "a" wave right atrial pressure is ?**
Harrison's 17th Ed. 1406, Table 223-1
A. 1 - 5 mm Hg
B. 2 - 10 mm Hg
C. 3 - 15 mm Hg
D. 4 - 20 mm Hg
- 296 Normal value of "v" wave right atrial pressure is ?**
Harrison's 17th Ed. 1406, Table 223-1
A. 1 - 5 mm Hg
B. 2 - 10 mm Hg
C. 3 - 15 mm Hg
D. 4 - 20 mm Hg
- 297 Normal value of systemic vascular resistance is ?**
Harrison's 17th Ed. 1406, Table 223-1
A. 300 - 600 [(dyn•s)/cm⁵]
B. 700 - 1600 [(dyn•s)/cm⁵]
C. 1000 - 2000 [(dyn•s)/cm⁵]
D. 1400 - 2600 [(dyn•s)/cm⁵]
- 298 Normal value of pulmonary vascular resistance is ?**
Harrison's 17th Ed. 1406, Table 223-1
A. 5 - 50 [(dyn•s)/cm⁵]
B. 20 - 130 [(dyn•s)/cm⁵]
C. 50 - 250 [(dyn•s)/cm⁵]
D. 100 - 600 [(dyn•s)/cm⁵]
- 299 Normal value of cardiac index is ?**
Harrison's 17th Ed. 1406, Table 223-1
A. 0.6 - 4.2 [(L/min)/m²]
B. 1.6 - 4.2 [(L/min)/m²]
C. 2.6 - 4.2 [(L/min)/m²]
D. 3.6 - 4.2 [(L/min)/m²]
- 300 Normal value of oxygen consumption index is ?**
Harrison's 17th Ed. 1406, Table 223-1
A. 10 - 50 [(L/min)/m²]
B. 50 - 100 [(L/min)/m²]
C. 110 - 150 [(L/min)/m²]
D. 150 - 250 [(L/min)/m²]
- 301 Normal value of arteriovenous oxygen difference is ?**
Harrison's 17th Ed. 1406, Table 223-1
A. 10 - 30 (mL/L)
B. 30 - 50 (mL/L)
C. 50 - 80 (mL/L)
D. 80 - 110 (mL/L)
- 302 Fick principle is used to measure ?**
Harrison's 17th Ed. 1406
A. Oxygen consumption index
B. Cardiac output
C. Arteriovenous oxygen difference
D. Systemic vascular resistance
-
- Cardiac output is estimated by Fick principle or by thermodilution method using thermistor on catheter.*
- 303 For calculating cardiac index (CI), cardiac output (Q) is divided by ?**
Harrison's 17th Ed. 1406
A. Body surface area
B. Body mass index
C. Height
D. Weight
- 304 Systemic vascular resistance (SVR) is calculated by which of the following formula ?**
Harrison's 17th Ed. 1406, Table 223-1
A. 50 (MAP - RA) / SBF
B. 60 (MAP - RA) / SBF
C. 70 (MAP - RA) / SBF
D. 80 (MAP - RA) / SBF
- 305 Which of the following variables is not included in calculating systemic vascular resistance (SVR) ?**
Harrison's 17th Ed. 1406
A. Mean aortic pressure

- B. Right atrial pressure
C. Left atrial mean pressure
D. Systemic blood flow
- 306 Gorlin formula is used to calculate which of the following ?**
Harrison's 17th Ed. 1406
A. Oxygen consumption index
B. Cardiac output
C. Systemic blood flow
D. Valve orifice area
- 307 In a normal heart, during systole, left ventricular pressure should be equal to that in ?**
Harrison's 17th Ed. 1406
A. Left atrium
B. Right ventricle
C. Aorta
D. Pulmonary artery
- 308 In a normal heart, during diastole, left atrial (pulmonary capillary wedge) pressure should be equal to that in ?**
Harrison's 17th Ed. 1406
A. Left ventricle
B. Right ventricle
C. Aorta
D. Pulmonary artery
- 309 In adults, normal value for left ventricular end-diastolic volume is ?**
Harrison's 17th Ed. 1406, Table 223-1
A. $42 \pm 15 \text{ mL/m}^2$
B. $52 \pm 15 \text{ mL/m}^2$
C. $62 \pm 15 \text{ mL/m}^2$
D. $72 \pm 15 \text{ mL/m}^2$
- 310 In adults, normal value for left ventricular end-systolic volume is ?**
Harrison's 16th Ed. 1331
A. $10 \pm 8 \text{ mL/m}^2$
B. $20 \pm 8 \text{ mL/m}^2$
C. $30 \pm 8 \text{ mL/m}^2$
D. $40 \pm 8 \text{ mL/m}^2$
- 311 Assessment of mitral and aortic valves during left ventriculography done in which projection ?**
Harrison's 16th Ed. 1331
A. Right anterior oblique
B. Left anterior oblique
C. Antero-posterior
D. Postero-anterior
- 312 Assessment of hypertrophic cardiomyopathy during left ventriculography done in which projection ?**
Harrison's 16th Ed. 1331
A. Right anterior oblique
B. Left anterior oblique

- C. Antero-posterior
D. Postero-anterior

- 313 Assessment of ventricular septal defect during left ventriculography done in which projection ?**

Harrison's 16th Ed. 1331

- A. Right anterior oblique
B. Left anterior oblique
C. Antero-posterior
D. Postero-anterior

Chapter 231. Principles of Electrophysiology

- 314 Electrocardiogram (ECG) was developed by ?**

Harrison's 18th Ed. 1860

- A. Hewlet
B. Judkin
C. Einthoven
D. White

ECG was developed by Einthoven at the turn of the twentieth century.

- 315 Sinoatrial (SA) node is located at the junction of ?**

Harrison's 18th Ed. 1860

- A. Right atrium and superior vena cava
B. Right atrium and inferior vena cava
C. Right atrium and left atrium
D. Right atrium and coronary sinus

SA node is composed of a cluster of small fusiform cells located in sulcus terminalis on epicardial surface of heart at right atrial - superior vena caval junction where they envelop SA nodal artery.

- 316 PR interval of ECG represents time needed for activation of ?**

Harrison's 18th Ed. 1860

- A. Both atria
B. Atrioventricular node (AVN)
C. Both atria + Atrioventricular node (AVN)
D. Both atria + AVN + His Purkinje system

Electrical impulse from SA node is transmitted slowly through nodal tissue to atria, and rapidly on to atrioventricular node (AVN), resulting in the P wave of the ECG.

- 317 Which of the following statements is false ?**

Harrison's 18th Ed. 1860

- A. Body surface ECG is the timed sum of cellular action potentials in atria & ventricles
B. Repolarization occurs first on endocardium then proceeds to epicardium
C. Activation of atria & AV node is PR interval
D. QT interval is duration of activation & recovery of ventricles

Repolarization occurs first on the epicardial surface, then proceeds to the endocardium.

- 318 Duration of action potential in cardiac myocytes is ?**

Harrison's 18th Ed. 1860

- A. 20 - 40 ms
B. 80 - 1600 ms

- C. 200 - 400 ms
D. 500 - 800 ms

Cardiac myocytes have a characteristically long action potential (200 - 400 ms) compared to neurons or skeletal muscle cells (1 - 5 ms).

319 Which of the following participate in the cardiac myocyte action potential ?

Harrison's 18th Ed. 1860

- A. Ion channels
B. Pumps, transporters
C. Exchangers
D. All of the above

The action potential of cardiac myocyte results from the activity of multiple distinctive time- and voltage-dependent ionic currents. The currents in turn are carried by transmembrane proteins that passively conduct ions down their electrochemical gradients through selective pores (ion channels), actively transport ions against their electrochemical gradient (pumps, transporters), or electrogenically exchange ionic species (exchangers).

320 Diastole corresponds to which phase of action potentials ?

Harrison's 18th Ed. 1861 Figure 231-1

- A. Phase 1
B. Phase 2
C. Phase 3
D. Phase 4

Phase 0 is rapid upstroke, phase 1 is early repolarization, phase 2 is plateau, phase 3 is late repolarization, and phase 4 is diastole.

321 Which of the following gene is responsible for ventricular repolarization ?

Harrison's 18th Ed. 1861 Figure 231-1

- A. KCNJ2
B. SCN5A
C. CACNA1C
D. SLC8A1

322 Which of the following is principal current during phase 4 ?

Harrison's 18th Ed. 1861 Figure 231-1

- A. I_{K1}
B. I_{to}
C. I_{Kr}
D. I_{Ks}

323 Which of the following determines the resting membrane potential of the myocyte ?

Harrison's 18th Ed. 1861 Figure 231-1

- A. I_{K1}
B. I_{to}
C. I_{Kr}
D. I_{Ks}

Potassium current (I_{K1}) is the principal current during phase 4 and determines the resting membrane potential of the myocyte.

324 Which of the following causes phase 3 repolarization ?

Harrison's 18th Ed. 1861 Figure 231-1

- A. Inactivation of the calcium current
B. Persistent activation of I_{Kr}
C. Persistent activation of I_{Ks}

- D. All of the above

Inactivation of the calcium current with persistent activation of potassium currents (predominantly I_{Kr} and I_{Ks}) causes phase 3 repolarization.

325 Sodium-calcium exchanger transports how many Na^+ for one Ca^{2+} ?

Harrison's 18th Ed. 1860

- A. 1
B. 2
C. 3
D. 4

Sodium-calcium exchanger transports three Na^+ for one Ca^{2+} .

326 Automaticity is a property of ?

Harrison's 18th Ed. 1861

- A. Sinoatrial (SA) node
B. His-Purkinje system
C. Coronary sinus
D. All of the above

Property of automaticity (pacemaking i.e. spontaneous diastolic depolarization) is characteristic of sinoatrial (SA) & atrioventricular (AV) nodes, His-Purkinje system, coronary sinus & pulmonary veins.

327 Early afterdepolarizations occur during ?

Harrison's 18th Ed. 1863, Figure 231-3

- A. Phases 0 and 1 of the action potential
B. Phases 1 and 2 of the action potential
C. Phases 2 and 3 of the action potential
D. Phases 3 and 4 of the action potential

328 Delayed afterdepolarizations occur after completion of ?

Harrison's 18th Ed. 1863, Figure 231-3

- A. Phase 1 of action potential
B. Phase 2 of action potential
C. Phase 3 of action potential
D. Phase 4 of action potential

Afterdepolarizations are spontaneous depolarizations due to membrane voltage oscillations in cardiac myocytes. Early afterdepolarizations (EAD) occur before the end of the action potential (phases 2 and 3), interrupting repolarization. Delayed afterdepolarizations (DAD) occur during phase 4 of the action potential after completion of repolarization.

329 Cellular feature common to induction of DADs is the presence of ?

Harrison's 18th Ed. 1862

- A. Increased Ca^{2+} load in the cytosol
B. Increased Na^+ load in the cytosol
C. Increased K^+ load in the cytosol
D. Increased Mg^{2+} load in the cytosol

The cellular feature common to induction of DADs is the presence of an increased Ca^{2+} load in the cytosol and sarcoplasmic reticulum.

330 Which of the following enhance Ca^{2+} loading sufficiently to produce DADs ?

Harrison's 18th Ed. 1862

- A. Digitalis glycoside toxicity
B. Catecholamines
C. Myocardial ischemia
D. All of the above

Digitalis glycoside toxicity, catecholamines, and ischemia all can enhance Ca^{2+} loading sufficiently to produce DADs.

331 Which of the following about connexins is false ?

Harrison's 18th Ed. 1864

- A. Gap junction membrane-spanning protein
- B. CMT1X is caused by mutations in connexin 32 gene
- C. Mutations in connexin 26 causes progressive hearing loss
- D. None of the above

Connexins are gap junction membrane-spanning structural proteins that are important in cell-to-cell communication. They pair across adjacent cells.

332 Chronically ischemic myocardium exhibits a downregulation of ?

Harrison's 18th Ed. 1864

- A. Connexin 26
- B. Connexin 31
- C. Connexin 32
- D. Connexin 43

Chronically ischemic myocardium exhibits a downregulation of the gap junction channel protein (connexin 43) that carries intercellular ionic current.

333 Epsilon waves in ECG are a feature of ?

Harrison's 18th Ed. 1864

- A. Wolff-Parkinson-White (WPW) syndrome
- B. Long QT syndrome
- C. Arrhythmogenic right ventricular dysplasia
- D. Brugada syndrome

334 Which of the following increases mortality rates in patients after myocardial infarction ?

Harrison's 18th Ed. 1864

- A. Late potentials
- B. T wave alternans (TWA) at low heart rates
- C. Decrease in heart rate variability (HRV)
- D. All of the above

335 Which of the following methods is related to autonomic nervous system influence on the heart ?

Harrison's 18th Ed. 1864

- A. Late potentials
- B. T wave alternans (TWA) at low heart rates
- C. QT interval variability (QTV)
- D. All of the above

Heart rate variability (HRV) & QT interval variability (QTV) provide noninvasive methods to assess autonomic nervous system influence on heart. A decrease in HRV is associated with increased sympathetic nervous system tone and increased mortality rates in patients after myocardial infarction.

336 Ventricular tachyarrhythmias occur more frequently in patients with ?

Harrison's 18th Ed. 1864

- A. Ventricular systolic dysfunction
- B. Hypertrophic cardiomyopathy
- C. Sarcoidosis
- D. All of the above

Ventricular tachyarrhythmias occur more frequently in patients with ventricular systolic dysfunction and chamber dilation, in hypertrophic cardiomyopathy, and in infiltrative diseases like sarcoidosis.

337 Supraventricular arrhythmias may be associated with ?

Harrison's 18th Ed. 1864

- A. Transposition of the great arteries
- B. Ebstein's anomaly
- C. Ostium primum atrial septal defect (ASD)
- D. Ventricular septal defects (VSD)

Supraventricular arrhythmias may be associated with Ebstein's anomaly.

338 Which of the following is a response to Head-up tilt (HUT) ?

Harrison's 18th Ed. 1865

- A. Initial increase in heart rate
- B. Drop in blood pressure
- C. Late reduction in heart rate
- D. All of the above

Exaggerated activation of a central reflex in response to Head-up tilt (HUT) testing produces a stereotypic response of an initial increase in heart rate, then a drop in blood pressure followed by a reduction in heart rate characteristic of neurally mediated hypotension.

339 Head-up tilt (HUT) is a useful tool in the diagnosis of and therapy for ?

Harrison's 18th Ed. 1865

- A. Recurrent idiopathic vertigo
- B. Chronic fatigue syndrome
- C. Recurrent transient ischemic attacks
- D. All of the above

HUT is used most often in patients with recurrent syncope. HUT is also a useful tool in the diagnosis of and therapy for recurrent idiopathic vertigo, chronic fatigue syndrome, recurrent transient ischemic attacks, and repeated falls of unknown etiology in the elderly.

340 Head-up tilt (HUT) testing is relatively contraindicated in ?

Harrison's 18th Ed. 1865

- A. Aortic stenosis
- B. Severe mitral stenosis
- C. Severe cerebrovascular disease
- D. All of the above

HUT is relatively contraindicated in the presence of severe CAD with proximal coronary stenoses, severe cerebrovascular disease, severe mitral stenosis, and obstruction to left ventricular outflow (aortic stenosis).

341 Which of the following relates best with Vaughan-Williams class I class of antiarrhythmic drugs ?

Harrison's 18th Ed. 1865

- A. Local anesthetic effect due to blockade of Na^+ current
- B. Interference of catecholamine action at β -adrenergic receptor
- C. Delayed repolarization by K^+ current inhibition or activation of depolarizing current
- D. Interference with calcium conductance

342 Which of the following relates best with Vaughan-Williams class II class of antiarrhythmic drugs ?

Harrison's 18th Ed. 1865

- A. Local anesthetic effect due to blockade of Na^+ current
- B. Interference of catecholamine action at β -adrenergic receptor
- C. Delayed repolarization by K^+ current inhibition or activation of depolarizing current
- D. Interference with calcium conductance

343 Which of the following relates best with Vaughan-Williams class III class of antiarrhythmic drugs ?

Harrison's 18th Ed. 1865

- A. Local anesthetic effect due to blockade of Na⁺ current
- B. Interference of catecholamine action at β -adrenergic receptor
- C. Delayed repolarization by K⁺ current inhibition or activation of depolarizing current
- D. Interference with calcium conductance

344 Which of the following relates best with Vaughan-Williams class IV class of antiarrhythmic drugs ?

Harrison's 18th Ed. 1865

- A. Local anesthetic effect due to blockade of Na⁺ current
- B. Interference of catecholamine action at β -adrenergic receptor
- C. Delayed repolarization by K⁺ current inhibition or activation of depolarizing current
- D. Interference with calcium conductance

Class I exert their antiarrhythmic action by local anesthetic effect by blockade of Na⁺ current, class II interfere with the action of catecholamines at β -adrenergic receptor, class III cause delay of repolarization due to inhibition of K⁺ current or activation of depolarizing current and class IV interfere with calcium conductance.

345 First catheter ablation using a DC energy source was performed in the early 1980s by ?

Harrison's 18th Ed. 1865

- A. Scheinman
- B. Hille
- C. Josephson
- D. Zipes

First catheter ablation using a DC energy source was performed in the early 1980s by Scheinman and colleagues.

346 Contraindications to exercise stress testing include all except ?

Harrison's 16th Ed. 1437

- A. Severe aortic stenosis
- B. Acute pericarditis
- C. Rest angina within 48 hours
- D. Active infective endocarditis

347 Ventricular tachycardia is defined as ?

Harrison's 16th Ed. 1343

- A. ≥ 3 consecutive VPCs at a rate > 100 per minute
- B. ≥ 3 consecutive VPCs at a rate > 150 per minute
- C. ≥ 3 consecutive VPCs at a rate > 200 per minute
- D. ≥ 3 consecutive VPCs at a rate > 250 per minute

348 Interpolated VPC is defined as a VPC ?

Harrison's 16th Ed. 1343

- A. That does not produce retrograde concealed conduction or influence the oncoming sinus impulse
- B. That produces retrograde concealed conduction and stops the oncoming sinus impulse
- C. That produces an inverted P wave by retrograde conduction
- D. None of the above

349 What was the impact of antiarrhythmic agents on mortality in the Cardiac Arrhythmia Suppression Trial (CAST) ?

Harrison's 16th Ed. 1344

- A. Significantly decreased
- B. Significantly increased
- C. Remained unchanged
- D. None of the above

350 In acute myocardial infarction, prophylactic antiarrhythmic therapy is recommend in ?

Harrison's 16th Ed. 1344

- A. All patients
- B. Young patients with complicated infarctions
- C. Patients with reinfarction
- D. Patients with hypertension

Chapter 232. The Bradyarrhythmias

351 Which of the following is false about nodal cells ?

Harrison's 18th Ed. 1867

- A. Less negative resting membrane potential
- B. Most rapid phase 4 depolarization
- C. Slow action potential upstrokes (phase 0)
- D. Action potential mediated by Na⁺ rather than Ca⁺⁺

In nodal cells, action potential mediated by Ca⁺⁺ rather than Na⁺ current.

352 Nodal cell action potentials exhibit which of the following ?

Harrison's 18th Ed. 1867

- A. More depolarized resting membrane potentials
- B. Slower phase 0 upstrokes
- C. Slower phase 4 diastolic depolarization
- D. All of the above

Nodal cell action potentials exhibit more depolarized resting membrane potentials, slower phase 0 upstrokes, and phase 4 diastolic depolarization.

353 Which of the following is not a feature of SA nodal cells ?

Harrison's 18th Ed. 1867

- A. Fewer myofibrils
- B. No intercalated disks
- C. Well developed sarcoplasmic reticulum
- D. No T-tubules

SA nodal cells have fewer distinct myofibrils than surrounding atrial myocardium, no intercalated disks, poorly developed sarcoplasmic reticulum, and no T-tubules.

354 In majority, SA nodal artery arises from ?

Harrison's 18th Ed. 1867

- A. Right coronary artery
- B. Left anterior descending artery
- C. Left circumflex artery
- D. Posterior descending artery

SA nodal artery arises from RCA in 55 - 60% and left circumflex artery in 40 - 45% of persons.

355 Membrane potential of SA nodal cells is ?

Harrison's 18th Ed. 1868

- A. -20 to -40 mV
- B. -40 to -60 mV

- C. -60 to -80 mV
- D. -80 to -100 mV

The action potentials of SA nodal cells are characterized by a relatively depolarized membrane potential of -40 to -60 mV, slow phase 0 upstroke, and relatively rapid phase 4 diastolic depolarization compared to the action potentials recorded in cardiac muscle cells.

356 Cushing's response is best related to ?

Harrison's 18th Ed. 1868

- A. Visual blurring
- B. Accelerated hypertension
- C. Increased intracranial pressure
- D. Dermopathy

Increased intracranial pressure producing SA nodal dysfunction is called Cushing's response.

357 Which of the following neuromuscular disease produce SA node disease ?

Harrison's 18th Ed. 1868

- A. Myasthenia gravis
- B. Botulism
- C. Lambert-Eaton syndrome
- D. Kearns-Sayre syndrome

Neuromuscular diseases like Kearns-Sayre syndrome (ophthalmoplegia, pigmentary degeneration of retina & cardiomyopathy) & myotonic dystrophy produce conducting system & SA node disease.

358 Sinus bradycardia is associated with all except ?

Harrison's 16th Ed. 1335

- A. Hypothyroidism
- B. Advanced liver disease
- C. Trypanosomiasis
- D. Brucellosis

359 Sinus bradycardia is associated with all except ?

Harrison's 16th Ed. 1335

- A. Typhoid fever
- B. Acute hypertension
- C. Hypercapnia
- D. Alkalosis

360 Sinus arrest means ?

Harrison's 16th Ed. 1335

- A. Failure of sinus impulse formation
- B. Block of conduction of sinus impulses to atrial tissue
- C. Block of conduction of sinus impulses at AV node
- D. Block of conduction of sinus impulses beyond AV node

361 Sinus exit block means ?

Harrison's 16th Ed. 1335

- A. Failure of sinus impulse formation
- B. Failure of conduction of sinus impulses to surrounding atrial tissue
- C. Failure of conduction of sinus impulses at AV node
- D. Failure of conduction of sinus impulses beyond AV node

Sinus pauses & sinus arrest result from failure of SA node to discharge, causing a pause without P waves visible on ECG. Intermittent failure of conduction from SA node produces sinus exit block.

362 Electrocardiographic manifestations of SA node dysfunction include ?

Harrison's 18th Ed. 1869

- A. Sinus pauses
- B. Sinus exit block
- C. Tachycardia
- D. All of the above

Electrocardiographic manifestations of SA node dysfunction include sinus bradycardia, sinus pauses, sinus arrest, sinus exit block, tachycardia (in SSS), and chronotropic incompetence.

363 Intermittent absence of P waves on ECG is due to ?

Harrison's 18th Ed. 1869

- A. Second-degree SA block
- B. Sinus exit block
- C. Sinus arrest
- D. Sick sinus syndrome

364 A prolongation of conduction time from SA node to surrounding atrial tissue is called ?

Harrison's 18th Ed. 1869

- A. First-degree sinoatrial exit block
- B. Second-degree sinoatrial exit block
- C. Third-degree sinoatrial exit block
- D. None of the above

365 The intermittent failure of conduction of sinus impulses to the surrounding atrial tissue is called ?

Harrison's 18th Ed. 1869

- A. First-degree sinoatrial exit block
- B. Second-degree sinoatrial exit block
- C. Third-degree sinoatrial exit block
- D. None of the above

366 Lack of atrial activity or the presence of an ectopic subsidiary atrial pacemaker is called ?

Harrison's 18th Ed. 1869

- A. First-degree sinoatrial exit block
- B. Second-degree sinoatrial exit block
- C. Third-degree sinoatrial exit block
- D. None of the above

Type I second-degree SA block results from progressive prolongation of SA node conduction with intermittent failure of the impulses originating in the sinus node to conduct to the surrounding atrial tissue. Second-degree SA block appears on the ECG as an intermittent absence of P waves. In type II second-degree SA block, there is no change in SA node conduction before the pause. Complete or third-degree SA block results in no P waves on the ECG.

367 Sick sinus syndrome refers to a combination of all except ?

Harrison's 17th Ed. 1418

- A. Sinus bradycardia
- B. Sinoatrial block
- C. Sinus arrest
- D. Sinus arrhythmia

ECG manifestations of SA node dysfunction include sinus bradycardia, sinus pauses, sinus arrest, sinus exit block, tachycardia (in SSS), and chronotropic incompetence (inability to increase heart rate in response to exercise or other stress appropriately).

368 In sinus arrest and in sinus exit block, atrial asystole is of what duration ?

Harrison's 17th Ed. 1418

- A. > 1 seconds
- B. > 1.5 seconds
- C. > 2.5 seconds
- D. > 3 seconds

Sinus pauses of up to 3 seconds are common in the awake athlete, & pauses of this duration or longer may be observed in asymptomatic elderly subjects.

369 In Tachycardia-bradycardia syndrome, which of the following is the most common tachycardia ?

Harrison's 18th Ed. 1869

- A. Atrial tachycardia
- B. Atrial flutter
- C. Atrial fibrillation
- D. Any of the above

Tachycardia-bradycardia syndrome manifests as alternating sinus bradycardia & atrial tachyarrhythmias. Although atrial tachycardia, atrial flutter, and atrial fibrillation may be observed, the latter is the most common tachycardia.

370 Which of the following is false about Mobitz type I SA nodal exit block ?

Harrison's 18th Ed. 1870, Figure 232-4

- A. Regularly irregular heart rhythm
- B. Decreasing P-P intervals before the pause
- C. Pause < twice the cycle length of last sinus interval
- D. None of the above

In Mobitz type I SA nodal exit block, there is grouped beating producing a regularly irregular heart rhythm. SA node rate is constant with progressive delay in exit from the node and activation of atria. This produces subtly decreasing P-P intervals before the pause, and the pause is less than twice the cycle length of the last sinus interval.

371 Chronotropic incompetence is failure to reach what percentage of predicted maximal heart rate at peak exercise?

Harrison's 18th Ed. 1869

- A. 55 %
- B. 65 %
- C. 75 %
- D. 85 %

Exercise testing is useful in discriminating chronotropic incompetence from resting bradycardia. Failure to increase the heart rate with exercise is called chronotropic incompetence. Alternatively defined as a failure to reach 85% of predicted maximal heart rate at peak exercise or failure to achieve a heart rate >100 beats/minute with exercise or a maximal heart rate with exercise less than two standard deviations below that of an age-matched control population.

372 Normal values of intrinsic heart rate are calculated by the formula ?

Harrison's 16th Ed. 1336

- A. $118.1 - (0.37 \times \text{age})$ beats per minute
- B. $118.1 - (0.47 \times \text{age})$ beats per minute
- C. $118.1 - (0.57 \times \text{age})$ beats per minute
- D. $118.1 - (0.67 \times \text{age})$ beats per minute

373 Normal values of intrinsic heart rate are calculated by the formula ?

Harrison's 18th Ed. 1869

- A. $116.2 - (0.53 \times \text{age})$ beats per minute
- B. $117.2 - (0.53 \times \text{age})$ beats per minute
- C. $118.2 - (0.53 \times \text{age})$ beats per minute

- D. $119.2 - (0.53 \times \text{age})$ beats per minute

Determining the intrinsic heart rate (IHR) may distinguish SA node dysfunction from slow heart rates resulting from high vagal tone. Normal IHR after administration of 0.2 mg/kg propranolol & 0.04 mg/kg atropine is $117.2 - (0.53 \times \text{age})$ in beats/minute. Low IHR is indicative of SA disease.

374 Which of the following is a sensitive and specific indicator of intrinsic SA node disease ?

Harrison's 18th Ed. 1870

- A. Sinus node recovery time (SNRT)
- B. Sinoatrial conduction time (SACT)
- C. Low intrinsic heart rate (IHR)
- D. All of the above

Sinus node recovery time (SNRT) is defined as the longest pause after cessation of overdrive pacing of right atrium near SA node (normal <1500 mseconds or, corrected for sinus cycle length, <550 mseconds). Sinoatrial conduction time (SACT) is defined as one-half the difference between intrinsic sinus cycle length and a noncompensatory pause after a premature atrial stimulus (normal <125 mseconds). Combination of an abnormal SNRT, an abnormal SACT, and a low IHR is a sensitive and specific indicator of intrinsic SA node disease.

375 In susceptible individual, SA node dysfunction may become manifest in the presence of which of the following ?

Harrison's 16th Ed. 1335

- A. Cardiac glycosides
- B. Amiodarone
- C. Calcium channel blockers
- D. All of the above

Cardiac glycosides, beta-blockers, calcium channel blockers, amiodarone may unmask evidence of sinus node dysfunction in susceptible individuals.

376 Which of the following pharmacologic agents may improve SA node function ?

Harrison's 18th Ed. 1870

- A. Class I Antiarrhythmics
- B. Class III Antiarrhythmics
- C. Calcium channel blockers
- D. Digitalis

Beta blockers and calcium channel blockers increase SNRT in patients with SA node dysfunction, and antiarrhythmic drugs with class I and III action may promote SA node exit block. Digitalis shortens SNRT in SA node dysfunction. Isoproterenol or atropine administered IV may increase sinus rate acutely. Theophylline increases heart rate.

377 The AV node lies at the ?

Harrison's 18th Ed. 1870

- A. Base of interatrial septum just above tricuspid annulus and anterior to coronary sinus
- B. Base of interatrial septum just below tricuspid annulus and anterior to coronary sinus
- C. Base of interatrial septum just above tricuspid annulus and posterior to coronary sinus
- D. Base of the interventricular septum just above tricuspid annulus and anterior to coronary sinus

378 Normal AV node in vivo possesses ?

Harrison's 16th Ed. 1342

- A. Automaticity always
- B. Automaticity sometimes
- C. No automaticity
- D. None of the above

379 Which of the following statements is false ?

Harrison's 18th Ed. 1870

- A. AV node is a subendocardial
- B. Located at posterior-inferior right atrium
- C. Located at apex of triangle of Koch
- D. None of the above

380 Boundaries of triangle of Koch include all except ?

Harrison's 18th Ed. 1870

- A. Coronary sinus ostium
- B. Septal tricuspid valve annulus
- C. Septal mitral valve annulus
- D. Tendon of Todaro

Triangle of Koch is bordered by coronary sinus ostium posteriorly, septal tricuspid valve annulus anteriorly & tendon of Todaro superiorly.

381 Which of the following about His bundle & bundle branches is false ?

Harrison's 18th Ed. 1870-1

- A. Minimally influenced by autonomic tone
- B. Have most rapid conduction in heart
- C. Insulated from ventricular myocardium
- D. None of the above

382 Myocytes that constitute the compact node have a resting membrane potential of about ?

Harrison's 18th Ed. 1871

- A. - 50 mV
- B. - 60 mV
- C. - 70 mV
- D. - 80 mV

Myocytes that constitute the compact node are depolarized with a resting membrane potential of about -60 mV. Action potentials have low amplitudes, slow upstrokes of phase 0 (<10 V/s), and phase 4 diastolic depolarization, high-input resistance and relative insensitivity to external [K⁺].

383 AV nodal cells lack which of the following ?

Harrison's 18th Ed. 1871

- A. I_{Na}
- B. I_{Ca-L}
- C. I_{Ca-T}
- D. I_f

AV nodal cells lack I_{K1} and I_{Na} ; I_{Ca-L} is responsible for phase 0. Phase 4 depolarization reflects the composite activity of the depolarizing currents I_f , I_{Ca-L} , I_{Ca-T} , and $INCX$ and the repolarizing currents I_{K1} and $IKAC_r$.

384 Which of the following is associated with SA node slowing and AV conduction block ?

Harrison's 18th Ed. 1871

- A. Carotid sinus hypersensitivity
- B. Cough
- C. Micturition syncope
- D. All of the above

Heightened vagal tone during sleep or in well-conditioned individuals can lead to all grades of AV block. Carotid sinus hypersensitivity, vasovagal syncope, and cough and micturition syncope may be associated with SA node slowing and AV conduction block.

385 Conditions that can produce AV conduction block include ?

Harrison's 18th Ed. 1871, Table 232-2

- A. Tuberculosis
- B. Lyme disease
- C. Diphtheria
- D. All of the above

386 Conditions that can produce AV conduction block include ?

Harrison's 18th Ed. 1871, Table 232-2

- A. Chagas disease
- B. Toxoplasmosis
- C. Syphilis
- D. All of the above

387 Conditions that can produce AV conduction block include ?

Harrison's 18th Ed. 1871, Table 232-2

- A. Sarcoidosis
- B. Systemic lupus erythematosus
- C. Rheumatoid arthritis
- D. All of the above

Infectious diseases that lead to conducting system disturbances include Lyme disease, Chagas' disease, and syphilis. Autoimmune and infiltrative diseases like SLE, RA, MCTD, scleroderma, amyloidosis (primary & secondary), sarcoidosis, and hemochromatosis may produce AV conduction block

388 Mutation in which of the following gene causes accelerated forms of progressive familial heart block ?

Harrison's 18th Ed. 1871

- A. KCNQ1
- B. KCNH2 (HERG)
- C. SCN5A
- D. ANK2

Accelerated forms of progressive familial heart block have been identified in families with mutations in cardiac sodium channel gene (SCN5A).

389 AV conduction block has been associated with which of the following ?

Harrison's 18th Ed. 1871, Table 232-2

- A. Kearns-Sayre syndrome
- B. Myotonic dystrophy
- C. Facioscapulohumeral muscular dystrophy
- D. All of the above

390 Congenital AV block may be seen in which of the following ?

Harrison's 18th Ed. 1871

- A. Transposition of the great arteries
- B. Ostium primum atrial septal defect
- C. Ventricular septal defect
- D. All of the above

391 Congenital AV block in a structurally normal heart is seen in children born to mothers with ?

Harrison's 18th Ed. 1871

- A. SLE
- B. Sarcoidosis
- C. Rheumatoid arthritis
- D. Hemochromatosis

Congenital AV block in a structurally normal heart is seen in children born to mothers with SLE.

392 In acute MI, AV block transiently develops in what percentage of patients ?

Harrison's 18th Ed. 1872

- A. 5 - 10 %
- B. 10 - 25 %
- C. 20 - 35 %
- D. 30 - 45 %

In acute MI, AV block transiently develops in 10 - 25 % of patients.

393 PR interval is determined by ?

Harrison's 17th Ed. 1420

- A. Atrial activation
- B. AV nodal activation
- C. His-Purkinje activation
- D. All of the above

I° AV block (PR interval > 200 ms) is a slowing of conduction through AV "junction". The site of delay is typically in AV node but may be in atria, AV node bundle of His, or His-Purkinje system.

394 I° AV block with wide QRS suggests delay in ?

Harrison's 18th Ed. 1872

- A. Proximal AV node
- B. Mid AV node
- C. Distal AV node
- D. Distal conduction system

I° AV block with wide QRS is suggestive of delay in the distal conduction system, whereas a narrow QRS suggests delay in the AV node proper or, less commonly, in the bundle of His.

395 Nationality of Woldemar Mobitz was ?

- A. Russian German
- B. British American
- C. Spanish
- D. Anglo Indian

Woldemar Mobitz (1889 - 1951) was a Russian-German physician.

396 Mobitz Type I is also named after ?

- A. Karel Frederik Wenckebach
- B. John Hay
- C. Robert Silverman
- D. Jack Upshaw

397 Mobitz Type II is also named after ?

- A. Karel Frederik Wenckebach
- B. John Hay
- C. Robert Silverman
- D. Jack Upshaw

398 In presence of a normal duration QRS complex, delay within AV node is the cause of prolonged PR interval if it is ?

Harrison's 16th Ed. 1337

- A. > 0.21 second
- B. > 0.22 second
- C. > 0.23 second
- D. > 0.24 second

399 When some atrial impulses fail to conduct to ventricles, the type of AV block is ?

Harrison's 18th Ed. 1872

- A. First-degree heart block
- B. Second-degree heart block
- C. Third-degree heart block
- D. Sick sinus syndrome

In II° AV block there is an intermittent failure of electrical impulse conduction from atrium to ventricle.

400 Which of the following statements about Mobitz type I, second degree AV block is false ?

Harrison's 18th Ed. 1872

- A. Also called AV Wenckebach block
- B. Progressive PR prolongation prior to block of an atrial impulse
- C. Pause that follows is fully compensatory
- D. PR interval of first conducted impulse is shorter than last conducted atrial impulse prior to blocked P wave

In Mobitz type 1 II° AV block, periodic failure of conduction occurs characterized by a progressively lengthening PR interval, shortening of RR interval, & a pause that is < 2 times the immediately preceding RR interval. ECG complex after the pause exhibits a shorter PR interval that immediately precedes the pause.

401 Which of the following statements about Mobitz type I second degree AV block is false ?

Harrison's 16th Ed. 1337

- A. Usually the difference between the longest & shortest PR intervals exceeds 100 mseconds
- B. Block is almost always localized to AV node
- C. Usually associated with a normal QRS duration
- D. Amiodarone therapy is a frequent cause

402 Which of the following statements about Mobitz type I second degree AV block is false ?

Harrison's 16th Ed. 1337

- A. Most often occurs transiently with inferior MI
- B. Due to Digitalis, β -blockers, and Ca^{++} channel blockers
- C. Seen in normal individuals with heightened vagal tone
- D. Leads to complete heart block

In Mobitz type 1 II° AV block, difference between the longest & shortest PR intervals exceeds 100 mseconds. It is almost always localized to AV node & associated with a normal QRS duration. It is seen most often as a transient abnormality with inferior wall infarction or with drug intoxication (digitalis, beta and calcium channel blockers) or in normal individuals with heightened vagal tone. Progression to complete heart block is uncommon, except in acute inferior wall myocardial infarction. Even when it does, this heart block is well tolerated because the escape pacemaker usually arises in the proximal His bundle & provides a stable rhythm & rarely requiring aggressive therapy.

403 Which of the following statements about Mobitz type II second degree AV block is false ?

Harrison's 16th Ed. 1337

- A. Conduction fails suddenly and unexpectedly without a preceding change in PR intervals
- B. Due to disease of His-Purkinje system and associated with prolonged QRS duration
- C. When Mobitz type II block occurs with a normal QRS duration, an intra-AV node block should be expected
- D. High incidence of progression to complete heart block with an unstable, slow, lower escape pacemaker

404 Which of the following statements about Mobitz type II second degree AV block is false ?

Harrison's 18th Ed. 1872

- A. Occur in anteroseptal myocardial infarction
- B. Occur in primary or secondary sclerodegenerative or calcific disorders of fibrous skeleton of heart
- C. Block is usually in AV node
- D. Block is usually in His-Purkinje system

405 Which of the following statements about Mobitz type II second degree AV block is false ?

Harrison's 18th Ed. 1872

- A. Intermittent failure of conduction of the P wave without changes in the preceding PR intervals
- B. Intermittent failure of conduction of the P wave without changes in the preceding RR intervals
- C. Typically occurs in distal or infra-His conduction system
- D. None of the above

Type 2 II° AV block is characterized by intermittent failure of conduction of the P wave without changes in the preceding PR or RR intervals. It typically occurs in distal or infra-His conduction system, is often associated with intraventricular conduction delays (bundle branch block), and is more likely to proceed to higher grades of AV block.

406 It may be difficult to distinguish between type I from type II block when AV block is ?

Harrison's 18th Ed. 1872

- A. 2 : 1
- B. 3 : 1
- C. 4 : 1
- D. 5 : 1

When AV block is 2:1, it may be difficult to distinguish type I from type II block. The finding of a His bundle electrogram after every atrial electrogram indicates that block is occurring in the distal conduction system.

407 Which of the following about Type II second-degree AV block is false ?

Harrison's 18th Ed. 1872

- A. Occurs in distal or infra-His conduction system
- B. Associated with intraventricular conduction delays
- C. May proceed to higher grades of AV block
- D. None of the above

Type II second-degree AV block typically occurs in distal or infra-His conduction system and is often associated with intraventricular conduction delays (bundle branch block). It is more likely to proceed to higher grades of AV block than is type I second-degree AV block.

408 "Paroxysmal AV block" best relates to ?

Harrison's 18th Ed. 1872

- A. Self correcting AV block
- B. Series of nonconducted P waves
- C. P waves buried in QRS complex
- D. P waves following QRS complex

Second-degree AV block (particularly type II) may be associated with a series of nonconducted P waves, referred to as paroxysmal AV block. It implies significant conduction system disease and is an indication for permanent pacing.

409 AV block that is intermediate between second degree & third degree is referred to as ?

Harrison's 18th Ed. 1872

- A. High-grade AV block

- B. Pre third degree AV block
- C. Post second degree AV block
- D. Paroxysmal AV block

AV block that is intermediate between second degree & third degree is referred to as high-grade AV block and like CHB implies advanced AV conduction system disease.

410 Which of the following about Third-degree AV block is false ?

Harrison's 18th Ed. 1872

- A. No atrial impulse propagates to ventricles
- B. Congenital complete AV block is localized to AV node
- C. In AV nodal block, QRS duration is prolonged
- D. In His bundle block, QRS duration is prolonged

Complete failure of conduction from atrium to ventricle is called complete or third-degree AV block. It is most often distal to the AV node. A wide QRS escape rhythm implies block in the distal His or bundle branches, while a narrow QRS rhythm implies block in the AV node or proximal His and an escape rhythm originating in the AV junction.

411 Which of the following about Lev's disease is false ?

Harrison's 16th Ed. 1337, Harrison's 17th Ed. 1419 Table 225-2

- A. Calcification & sclerosis of fibrous cardiac skeleton
- B. Frequently involves pulmonary & tricuspid valves
- C. Involves central fibrous body & summit of ventricular septum
- D. Produces AV block

412 Which of the following about Lenegre's disease is false ?

Harrison's 16th Ed. 1337, Harrison's 17th Ed. 1419 Table 225-2

- A. Primary sclerodegenerative disease in conducting system
- B. No involvement of myocardium
- C. Involves fibrous skeleton of heart
- D. Cause of isolated chronic heart block in adults

413 Which of the following improve conduction through AV node & impair infranodal conduction ?

Harrison's 18th Ed. 1873

- A. Atropine
- B. Isoproterenol
- C. Exercise
- D. All of the above

Atropine, isoproterenol & exercise improve conduction through AV node & impair infranodal conduction.

414 To obtain a recording from the bundle of His, the electrode catheter is positioned ?

Harrison's 18th Ed. 1873

- A. Across the pulmonary valve
- B. Across the tricuspid valve
- C. In coronary sinus
- D. In superior vena cava

Recording of His bundle electrogram by a catheter positioned at superior margin of tricuspid valve annulus provides information about conduction at all levels of AV conduction axis.

415 AH interval in the His bundle recording represents an indirect method of assessing ?

Harrison's 18th Ed. 1873

- A. AV nodal conduction time
- B. Atrial conduction time
- C. Sinus node activation time

D. None of the above

Time from the most rapid deflection of the atrial electrogram in the His bundle recording to the His electrogram (AH interval) represents conduction through the AV node and is normally <130 ms.

416 HV interval in the His bundle recording represents conduction time through ?

Harrison's 18th Ed. 1873

- A. AV node
- B. His bundle
- C. His-Purkinje system
- D. Endocardium to epicardium

417 Normal HV interval in the His bundle recording is ?

Harrison's 18th Ed. 1873

- A. 10 to 20 ms
- B. 15 to 35 ms
- C. 35 to 55 ms
- D. 60 to 75 ms

The time from the His electrogram to the earliest onset of the QRS on the surface ECG (HV interval) represents the conduction time through the His-Purkinje system and is normally 55 ms.

418 Normal PA interval in the His bundle recording is ?

Harrison's 17th Ed. 1421

- A. 30 ms
- B. 40 ms
- C. 50 ms
- D. 60 ms

PA interval is the time from the earliest onset of P wave on surface ECG to onset of atrial deflection on His bundle catheter. It is an index of intraatrial conduction time & should be 50 ms.

419 Normal AH interval in the His bundle recording is ?

Harrison's 17th Ed. 1421

- A. 10 to 50 ms
- B. 60 to 125 ms
- C. 125 to 180 ms
- D. 180 to 250 ms

420 Anisotropic conduction means impulse propagation is more rapid ?

Harrison's 16th Ed. 1334

- A. Parallel to fiber orientation than transverse to it
- B. Transverse to fiber orientation than parallel to it
- C. In a particular fiber type
- D. In a particular fiber length

Impulse propagation is more rapid parallel to fiber orientation than transverse to it. This property is termed anisotropic conduction.

421 "Effective" refractory period is defined as that portion of action potential during which ?

Harrison's 16th Ed. 1334

- A. No stimulus can evoke another response
- B. Stimulus can evoke a local, nonpropagated response
- C. Stronger stimulus is required to evoke a response
- D. Weaker stimulus can evoke a response

Effective refractory period is that part of the action potential during which a stimulus can evoke only a local, nonpropagated response.

422 To obtain a recording of left atrial activity, the electrode catheter is positioned ?

Harrison's 16th Ed. 1334

- A. Across the pulmonary valve
- B. Across the tricuspid valve
- C. In the coronary sinus
- D. In the superior vena cava

Left atrial activity is recorded directly via a catheter placed across a patent foramen ovale or indirectly using a catheter inserted into the coronary sinus.

423 Intrinsic discharge rate is highest of which of the following potential cardiac pacemakers ?

Harrison's 16th Ed. 1335

- A. Sinus node
- B. Specialized fibers of His-Purkinje system
- C. Some specialized atrial fibers
- D. None of the above

SA node is normally the dominant cardiac pacemaker because its intrinsic discharge rate is the highest of all potential cardiac pacemakers.

424 Which of the following conditions do not require electrophysiologic tests for diagnosis in 'symptomatic' patients with ECG documentation of ?

Harrison's 16th Ed. 1336

- A. Asystole
- B. Sinoatrial block or arrest
- C. Bradycardia-tachycardia syndrome
- D. All of the above

Symptomatic patients with ECG documentation of asystole, sinoatrial block or arrest, or the bradycardia-tachycardia syndrome do not require electrophysiologic tests for diagnosis.

425 Escape pacemaker following AV nodal block is usually in ?

Harrison's 16th Ed. 1336

- A. His bundle
- B. Bundle branches
- C. Purkinje fibres
- D. Ventricular myocardium

Escape pacemaker following AV nodal block is usually in the His bundle.

426 Which of the following statements about escape pacemaker in His bundle is false ?

Harrison's 16th Ed. 1336

- A. Has a rate of 40 to 60 beats per minute
- B. Is associated with a QRS complex of normal duration
- C. Is the escape pacemaker following AV nodal block
- D. Is unstable

Escape pacemaker in His bundle is stable with discharge rate of 40 to 60 beats/minute, associated with a QRS complex of normal duration.

427 Which of the following statements about escape pacemaker in distal His-Purkinje system is false ?

Harrison's 16th Ed. 1336

- A. Has a rate of 25 to 45 beats per minute
- B. Wide QRS complex of prolonged duration
- C. Is the escape pacemaker following AV nodal block
- D. Is unstable

Escape rhythms arising in the distal His-Purkinje system have lower intrinsic rates (25 to 45 beats/minute), manifest wide QRS complexes with prolonged duration and are unstable.

428 Which of the following is false ?

Harrison's 17th Ed. 1422

- A First-degree AV block is intranodal
- B Mobitz type 1 second-degree AV block is intranodal
- C Mobitz type 2 second-degree block is infranodal
- D None of the above

429 How many letter codes are used for describing pacemaker modes & function ?

Harrison's 18th Ed. 1875

- A 3
- B 4
- C 5
- D 6

Pacemaker modes & function are named using a five-letter code.

430 The first letter in the pacing code indicates ?

Harrison's 18th Ed. 1875

- A Chamber(s) paced
- B Chamber in which electrical activity is sensed
- C The response to a sensed electric signal
- D Programmability and rate modulation

431 The second letter in the Pacing Code indicates ?

Harrison's 18th Ed. 1875

- A Chamber(s) paced
- B Chamber in which electrical activity is sensed
- C The response to a sensed electric signal
- D Programmability and rate modulation

432 The third letter in the Pacing Code indicates ?

Harrison's 18th Ed. 1875

- A Chamber(s) paced
- B Chamber in which electrical activity is sensed
- C The response to a sensed electric signal
- D Programmability and rate modulation

433 The fourth letter in the Pacing Code indicates ?

Harrison's 18th Ed. 1875

- A Chamber(s) paced
- B Chamber in which electrical activity is sensed
- C The response to a sensed electric signal
- D Programmability and rate modulation

In pacing code, the first letter indicates the chamber(s) that is paced (O, none; A, atrium; V, ventricle; D, dual; S, single), the second letter indicates the chamber(s) in which sensing occurs (O, none; A, atrium; V, ventricle; D, dual; S, single), the third letter indicates the response to a sensed event (O, none; I, inhibition; T, triggered; D, inhibition + triggered), the fourth letter refers to the programmability or rate response (R, rate responsive), and the fifth refers to the existence of antitachycardia functions if present (O, none; P, antitachycardia pacing; S, shock; D, pace + shock).

434 Twiddler's syndrome best relates to ?

Harrison's 18th Ed. 1875

- A Failing battery of pacemaker
- B Interference by external stimuli on pacemaker

- C Rotation of pacemaker pulse generator in its pocket
- D All of the above

Rotation of the pacemaker pulse generator in its subcutaneous pocket, either intentionally or inadvertently, often referred to as "twiddler's syndrome" producing dislodgment with failure to sense or pace the heart.

435 Pacemaker syndrome is associated in those ?

Harrison's 18th Ed. 1875

- A Who do not maintain AV synchrony
- B Who do not have adequate cardiac output
- C Who have chronic illnesses (HTN, DM)
- D All of the above

Pacemaker syndrome is a constellation of signs and symptoms associated with any mode of pacing that does not maintain or restore AV synchrony.

436 Class I indication for pacing in SA node dysfunction include all except ?

Harrison's 18th Ed. 1875 Table 232-3

- A Documented symptomatic bradycardia
- B Syncope of unexplained origin with major abnormalities of SA node dysfunction
- C Sinus node dysfunction associated long-term drug therapy for which there is no alternative
- D Symptomatic chronotropic incompetence

Class I indications for pacing in SA node dysfunction include documented symptomatic bradycardia, sinus node dysfunction associated long-term drug therapy for which there is no alternative, or symptomatic chronotropic incompetence.

Chapter 233. The Tachyarrhythmias

437 Tachyarrhythmias typically refer to ?

Harrison's 18th Ed. 1878

- A Isolated premature complexes (depolarizations)
- B Nonsustained forms of tachycardia originating from myocardial foci or reentrant circuits
- C Sustained forms of tachycardia originating from myocardial foci or reentrant circuits
- D All of the above

438 In tachycardia, the ventricular rate should be ?

Harrison's 18th Ed. 1878

- A > 90 beats/minute
- B > 100 beats/minute
- C > 110 beats/minute
- D > 120 beats/minute

Definition of tachycardia is rhythm that produces a ventricular rate >100 beats/minute.

439 Which of the following statements is false ?

Harrison's 18th Ed. 1879

- A Pacing does not provoke automatic rhythms
- B Pacing provoke tachycardias due to triggered activity
- C Abnormal automaticity is responsible for APCs & VPCs
- D None of the above

440 Abnormal impulse formation due to triggered activity is related to ?*Harrison's 18th Ed. 1879*

- A. Reentry
- B. Extra pathways
- C. Myocardial ion channel abnormalities
- D. Cellular afterdepolarizations

Abnormal impulse formation is due to the development of triggered activity. Triggered activity is related to cellular afterdepolarizations that occur at the end of the action potential, during phase 3 (early afterdepolarizations), or after the action potential, during phase 4 (late afterdepolarizations).

441 Afterdepolarizations are due to an increase in ?*Harrison's 18th Ed. 1879*

- A. Intracellular calcium accumulation
- B. Altered sodium transport
- C. Altered potassium transport
- D. Intracellular potassium deficiency

Afterdepolarizations are attributable to an increase in intracellular calcium accumulation.

442 Early afterdepolarizations is responsible for ?*Harrison's 18th Ed. 1879*

- A. Catecholamine-sensitive VT
- B. Atrial tachyarrhythmias caused by digoxin toxicity
- C. Torsades des pointes
- D. All of the above

Early afterdepolarizations may be responsible for VPCs that trigger torsades des pointes (TDP). Late afterdepolarizations are responsible for atrial, junctional & fascicular tachyarrhythmias caused by digoxin toxicity and for catecholamine-sensitive VT originating in the outflow tract.

443 Late afterdepolarizations in digoxin toxicity may lead to ?*Harrison's 18th Ed. 1879*

- A. Atrial tachyarrhythmias
- B. Junctional tachyarrhythmias
- C. Fascicular tachyarrhythmias
- D. All of the above

Late afterdepolarizations caused by digoxin toxicity may lead to atrial, junctional, and fascicular tachyarrhythmias.

444 Inhomogeneities in myocardial conduction and/or recovery leading to reentry is exaggerated by ?*Harrison's 18th Ed. 1879*

- A. Presence of extra pathways
- B. Myocardial ion channel abnormalities
- C. Myocardial fibrosis
- D. All of the above

Reentry is due to inhomogeneities in myocardial conduction and/or recovery properties. Inhomogeneities can be exaggerated by the presence of extra pathways (WPW syndrome), generalized genetically determined myocardial ion channel abnormalities (long QT syndrome) or by the interruption of normal myocardial patterns of activation due to the development of fibrosis.

445 Crista terminalis is located in ?*Harrison's 18th Ed. 1879*

- A. Right atrium
- B. Left atrium
- C. Right ventricle
- D. Left ventricle

Crista terminalis is a natural anatomic barrier of conduction. It is the vertical crest on interior wall of right atrium that separates nontrabeculated posterior right atrium from rest of the trabeculated right atrium.

446 Which of the following is a genetically determined ion channel abnormality ?*Harrison's 18th Ed. 1879*

- A. Brugada syndrome
- B. LQTS
- C. Catecholaminergic polymorphic VT
- D. All of the above

447 Which of the following statements about mechanism of sustained paroxysmal tachyarrhythmia is false ?*Harrison's 16th Ed. 1342*

- A. Electrophysiologic inhomogeneity
- B. Unidirectional block in one pathway
- C. Fast conduction over an alternative pathway
- D. Reexcitation of the initially blocked pathway

448 Which of the following statements about mechanism of tachyarrhythmia is false ?*Harrison's 16th Ed. 1342*

- A. Reentrant arrhythmias can be reproducibly initiated and terminated by premature complexes and rapid stimulation
- B. Myocardial cells do not possess pacemaker activity
- C. Tachycardia caused by automaticity cannot be started or stopped by pacing
- D. Triggered activity is caused by early afterdepolarizations only

449 Which of the following statements about atrial premature complexes (APCs) is false ?*Harrison's 16th Ed. 1342*

- A. Can be found in over 90 % of normal adults
- B. May originate from any location in either atrium
- C. P wave of APC differs from sinus P wave morphology
- D. Conduct to ventricles when they occur late in cardiac cycle

450 Which of the following statements about atrial premature complexes (APCs) is false ?*Harrison's 16th Ed. 1342*

- A. Sum of pre-and postextrasystolic PP intervals is less than the sum of two sinus PP intervals
- B. QRS complex following most APCs is normal
- C. Alcohol, tobacco or adrenergic stimulants precipitate APCs
- D. None of the above

451 Which of the following about APCs is false ?*Harrison's 18th Ed. 1880*

- A. Most common arrhythmia
- B. Frequently increases with age & structural heart disease
- C. Asymptomatic
- D. None of the above

452 APCs from which of the following may mimic the sinus P wave morphology ?*Harrison's 18th Ed. 1880*

- A. Right atrial appendage

- B. Superior vena cava (SVC)
- C. Superior aspect of crista terminalis
- D. All of the above

P wave contour differs from that seen during sinus rhythm. APCs from right atrial appendage, superior vena cava (SVC) and superior aspect of the crista terminalis in the region of sinus node may mimic sinus P wave morphology.

453 Which of the following about APCs is false ?

Harrison's 18th Ed. 1880

- A. APCs characteristically reset the sinus node
- B. Sum of pre- & post-APC RR is < 2 sinus PP intervals
- C. Class IC antiarrhythmic agents may eliminate APCs
- D. None of the above

APCs characteristically reset the sinus node. The resulting sum of the pre- and post-APC RR interval is less than two sinus PP intervals. Class IC antiarrhythmic agents may eliminate the APCs but should be avoided if structural heart disease is present.

454 Which of the following about junctional premature complexes is false ?

Harrison's 18th Ed. 1880

- A. Extremely uncommon
- B. Originate from AV node & His bundle region
- C. Produce retrograde atrial activation
- D. None of the above

JPCs are extremely uncommon. Complexes originate from AV node & His bundle region & may produce retrograde atrial activation with P wave distorting the initial or terminal portions of QRS complex producing pseudo Q or S waves in leads II, III, and aVF.

455 Which of the following is not true for physiologic sinus tachycardia ?

Harrison's 16th Ed. 1344

- A. Present when heart rate exceeds 100 beats/min
- B. Heart rate rarely exceeds 200 beats/min
- C. Has a gradual onset and offset
- D. Carotid sinus pressure produces slowing with sudden return to previous rate upon cessation

Sinus tachycardia, carotid sinus pressure produces modest & transient slowing but no abrupt termination.

456 Which of the following about inappropriate sinus tachycardia is false ?

Harrison's 18th Ed. 1881

- A. Heart rate increases spontaneously
- B. Heart rate increases out of proportion to stress/exercise
- C. Part of postviral dysautonomia
- D. Anxiolytics are the treatment of choice

In inappropriate sinus tachycardia, heart rate increases either spontaneously or out of proportion to the degree of physiologic stress/exercise. It may occur after a viral illness and resolve spontaneously over 3 - 12 months (postviral dysautonomia). Maintaining hydration, salt loading, and beta blockers minimizes symptoms.

457 Which of the following is the most common sustained arrhythmia ?

Harrison's 18th Ed. 1881

- A. Atrial flutter
- B. Atrial fibrillation
- C. AV nodal reentrant tachycardia (AVNRT)
- D. None of the above

AF is the most common sustained arrhythmia.

458 Paroxysmal AF is triggered by automatic foci located in ?

Harrison's 16th Ed. 1346

- A. Left atrium
- B. Right atrium
- C. Pulmonary veins
- D. All of the above

459 In atrial fibrillation, the ventricular rate is usually ?

Harrison's 18th Ed. 1881

- A. 120 and 160 bpm
- B. 150 and 180 bpm
- C. 200 and 260 bpm
- D. 250 and 280 bpm

AF produces disorganized, rapid & irregular atrial activation with irregular ventricular response. Depending on conduction properties of AV junction, rate varies between 120 & 160 beats/minute.

460 Which of the following relates best to AF initiation & maintenance ?

Harrison's 18th Ed. 1881

- A. Atrial scarring
- B. Atrialized musculature that enters pulmonary veins
- C. Accessory atrio-ventricular tracts
- D. All of the above

Drivers responsible for initiation and maintenance of AF originate from atrialized musculature that enters the pulmonary veins.

461 'Lone AF' often represents the tachycardia phase of ?

Harrison's 16th Ed. 1345

- A. Thyrotoxicosis
- B. Tachycardia - bradycardia syndrome
- C. Acute alcoholic intoxication
- D. All of the above

462 'Tachycardia-induced cardiomyopathy' is caused by ?

Harrison's 16th Ed. 1345

- A. Digitalis
- B. Atrial Fibrillation
- C. Thyrotoxicosis
- D. Acute alcoholic intoxication

463 Which of the following is a precipitating factor for acute AF ?

Harrison's 16th Ed. 1345

- A. Pulmonary emboli
- B. CHF
- C. Pericarditis
- D. All of the above

464 In AF, if a patient's clinical status is severely compromised, which of the following is the treatment of choice ?

Harrison's 16th Ed. 1345

- A. β adrenergic blocker
- B. Calcium channel antagonist
- C. Digitalis
- D. Electrical cardioversion

465 It is difficult to convert AF to sinus rhythm and/or maintain it, despite therapy, when the left atrial diameter exceeds ?

Harrison's 16th Ed. 1345

- A. 2.5 cm
- B. 3.5 cm
- C. 4.5 cm
- D. 5.5 cm

466 IV heparin treatment is begun, if the duration of AF is ?

Harrison's 18th Ed. 1881

- A. > 3 hours
- B. > 6 hours
- C. > 9 hours
- D. > 12 hours

IV heparin tt. is begun if duration of AF is >12 hours & risk factors for stroke with AF are present.

467 Ventricular rate control for acute AF is best established with ?

Harrison's 18th Ed. 1881

- A. Adenosine
- B. Beta blockers
- C. Amiodarone
- D. Digoxin

Ventricular rate control for acute AF is best established with beta blockers and/or calcium channel blocking agents, verapamil or diltiazem. Digoxin may add to the rate-controlling benefit of other agents but is uncommonly used as a stand-alone agent, especially in acute AF.

468 In AF, conversion to sinus rhythm by cardioversion should be done after proper anticoagulation for ?

Harrison's 18th Ed. 1881

- A. 1 week
- B. 2 weeks
- C. 3 weeks
- D. 4 weeks

For patients who do not warrant early cardioversion of AF, anticoagulation should be maintained for at least 3 weeks with the INR confirmed to be >1.8 on at least two separate occasions prior to attempts at cardioversion.

469 In AF, following cardioversion, anticoagulation must be maintained for ?

Harrison's 18th Ed. 1881

- A. 1 week
- B. 2 weeks
- C. 3 weeks
- D. 4 weeks

470 Electrical cardioversion for AF is accomplished through delivery of ?

Harrison's 18th Ed. 1881

- A. At least 40 J
- B. At least 100 J
- C. At least 200 J
- D. At least 400 J

Direct current transthoracic cardioversion during short-acting anesthesia is a reliable way to terminate AF. Conversion rates using a 200-J biphasic shock delivered synchronously with the QRS complex typically are >90%.

471 Electrical cardioversion for atrial flutter is accomplished through delivery of ?

Harrison's 18th Ed. 1886

- A. 20 - 40 J

- B. 50 - 100 J
- C. 100 - 150 J
- D. 150 - 300 J

Organized atrial flutter activity can frequently be terminated with low-energy external cardioversion of 50 - 100 J.

472 Electrical cardioversion for atrioventricular nodal reentrant tachycardia (AVNRT) is accomplished through delivery of ?

Harrison's 18th Ed. 1888

- A. 20 - 40 J
- B. 50 - 100 J
- C. 100 - 200 J
- D. 200 - 300 J

R wave synchronous DC cardioversion using 100 - 200 J can terminate atrioventricular nodal reentrant tachycardia (AVNRT).

473 What energy should be used for initial attempts at terminating VF ?

Harrison's 16th Ed. 1356

- A. At least 100 W
- B. At least 200 W
- C. At least 300 W
- D. At least 400 W

474 In AF, pretreatment with which of the following drugs facilitates cardioversion ?

Harrison's 18th Ed. 1882

- A. Ibutilide
- B. Beta blocker
- C. Calcium antagonist
- D. Digitalis

IV ibutilide is more effective and may be used in selected patients to facilitate termination with direct current (DC) cardioversion.

475 Which drug is preferred in AF to maintain sinus rhythm in patients without evidence of structural heart disease ?

Harrison's 18th Ed. 1882

- A. Sotalol
- B. Flecainide
- C. Amiodarone
- D. Dofetilide

In AF patients without evidence of structural heart disease, use of flecainide or propafenone (class IC) is well tolerated and does not have significant proarrhythmia risk.

476 The Cox-MAZE procedure is a surgical approach to cure ?

Harrison's 18th Ed. 1885

- A. AF
- B. VT
- C. PSVT
- D. All of the above

Most ablation strategies isolate atrial muscle sleeves entering the pulmonary veins which are a source of triggers responsible for initiation of AF. Risks include pulmonary vein stenosis, atriopharyngeal fistula, systemic embolic events & perforation/tamponade. The Cox-Maze procedure is designed to interrupt all macroreentrant circuits that might potentially develop in the atria, thereby precluding the ability of the atria to fibrillate.

477 Which of the following statements is false about macroreentrant arrhythmias ?

Harrison's 18th Ed. 1885

- A. Macroreentrant arrhythmias involving atrial myocardium are called AFL

- B. Nonfocal source of an atrial arrhythmia
- C. AFL is poorly tolerated than AF
- D. None of the above

Macroreentrant nonfocal arrhythmias involving the atrial myocardium are referred to collectively as AFL.

478 Atrial flutter is a form of atrial reentry localized to the ?

Harrison's 18th Ed. 1885

- A. Right atrium
- B. Left atrium
- C. Both atria
- D. Both atria and AV node

479 Typical AFL circuit rotates around ?

Harrison's 18th Ed. 1885

- A. Mitral valve annulus
- B. Tricuspid valve annulus
- C. Aortic valve annulus
- D. Pulmonary valve annulus

480 In ECG, flutter waves of atrial flutter are most prominent in ?

Harrison's 18th Ed. 1885

- A. Inferior leads
- B. Anterior leads
- C. Posterior leads
- D. Lateral leads

Typical AFL circuit rotates in right atrium around tricuspid valve annulus. Counterclockwise right AFL with superiorly directed activation of interatrial septum produces saw-toothed appearance of P waves in ECG leads II, III and aVF. Clockwise rotation of right atrial circuit produces predominantly positive P waves in leads II, III, and aVF.

481 In atrial flutter, the atrial rate is ?

Harrison's 18th Ed. 1885

- A. 150 and 250 bpm
- B. 260 and 300 bpm
- C. 300 and 400 bpm
- D. 400 and 550 bpm

Classic or typical right AFL has an atrial rate of 260 - 300 beats/minute with a ventricular response at 2:1 or 130 - 150 beats/minute.

482 Which of the following drugs is particularly effective for conversion of atrial flutter to sinus rhythm ?

Harrison's 18th Ed. 1886

- A. Ibutilide
- B. Beta blocker
- C. Calcium antagonist
- D. Digitalis

In AFL, rate control with calcium antagonists (diltiazem, verapamil), beta blockers, and/or digoxin is difficult. In patients with high anesthetic risk, pharmacologic cardioversion with procainamide, amiodarone or ibutilide is appropriate. Antiarrhythmic drug therapy may enhance efficacy of direct current cardioversion & maintenance of sinus rhythm after cardioversion.

483 Which of the following drugs is useful in preventing recurrences of atrial flutter ?

Harrison's 16th Ed. 1347

- A. Quinidine
- B. Sotalol

- C. Amiodarone
- D. All of the above

484 Which of the following statements about multifocal atrial tachycardia (MAT) is false ?

Harrison's 16th Ed. 1350

- A. Defined as ≥ 3 consecutive P waves of different morphologies at rates >100 beats/minute
- B. Common following theophylline administration
- C. Irregular ventricular rate
- D. High incidence of VF

There is a high incidence of AF in patients with MAT.

485 Which of the following is the signature tachycardia of significant pulmonary disease ?

Harrison's 18th Ed. 1886

- A. Atrial flutter
- B. Atrial fibrillation
- C. Multifocal atrial tachycardia
- D. AV Nodal reentrant tachycardia

Multifocal AT (MAT) is the signature tachycardia of patients with significant pulmonary disease.

486 Which of the following about multifocal atrial tachycardia is false ?

Harrison's 18th Ed. 1886

- A. Signature tachycardia of significant pulmonary disease
- B. Isoelectric baseline on ECG
- C. Absence of any intervening sinus rhythm
- D. None of the above

Macroreentrant ATs represent continuous atrial activation and isoelectric baseline between P waves is frequently absent.

487 Focal ATs can be distinguished by ?

Harrison's 18th Ed. 1886

- A. Response to adenosine
- B. Response to amiodarone
- C. Response to verapamil
- D. All of the above

Focal ATs can be distinguished by observations made at AT initiation & in response to adenosine.

488 Which of the following is false about automatic atrial tachycardias ?

Harrison's 18th Ed. 1886

- A. Respond to adenosine
- B. Provoked by isoproterenol infusion
- C. First P wave of AT has same morphology as remaining waves
- D. None of the above

Automatic ATs start with a "warm-up" period over the first 3 - 10 complexes and slow in rate before termination. They may respond to adenosine. Initiation of automatic ATs frequently can be provoked by isoproterenol infusion. First P wave of tachycardia has same morphology as remaining waves.

489 Which of the following is false about focal reentrant atrial tachycardias ?

Harrison's 18th Ed. 1886

- A. Initiate with spontaneous premature beats
- B. P wave initiating tachycardia has different morphology than P wave during sustained AT

- C. Do not slow and/or terminate with adenosine
- D. None of the above

Focal reentrant AT initiate with programmed atrial stimulation or spontaneous premature beats. P wave initiating tachycardia has a different morphology than P wave during sustained AT. P wave in AT is characteristically distinct from the sinus P-wave morphology. With adenosine, reentrant ATs will produce AV block but typically do not slow and/or terminate.

490 Which of the following is an anatomic ridge in heart ?

Harrison's 18th Ed. 1887

- A. Crista terminalis
- B. Valve annuli
- C. Limbus of fossa ovalis
- D. All of the above

Anatomic ridges of heart are crista terminalis, valve annuli or limbus of the fossa ovalis.

491 Incidence of supraventricular tachycardia (SVT) is about ?

N Engl J Med 2006;354:1039-51

- A. 35 cases per 100,000 persons per year
- B. 70 cases per 100,000 persons per year
- C. 100 cases per 100,000 persons per year
- D. 150 cases per 100,000 persons per year

492 Prevalence of supraventricular tachycardia is about ?

N Engl J Med 2006;354:1039-51

- A. 2.25 per 1000
- B. 5 per 1000
- C. 10 per 1000
- D. 20 per 1000

493 Which of the following symptoms is uncommon in supraventricular tachycardia ?

N Engl J Med 2006;354:1039-51

- A. Palpitations
- B. Dyspnea
- C. Light-headedness
- D. Syncope

494 Which of the following statements about SVT is false ?

N Engl J Med 2006;354:1039-51

- A. Most have a reentry mechanism
- B. Classified according to location of reentry circuit
- C. ~ 60 % are due to AV nodal reentry circuit
- D. SVT is usually associated with structural heart disease

495 In SVT, adenosine is contraindicated in patients with ?

N Engl J Med 2006;354:1039-51

- A. In heart-transplant recipients
- B. In patients with severe obstructive lung disease
- C. In patients with tachycardia with a wide QRS complex
- D. All of the above

496 Which of the following drugs are used in treatment of SVT ?

N Engl J Med 2006;354:1039-51

- A. Adenosine
- B. Intravenous verapamil
- C. Intravenous beta-blocker

- D. All of the above

497 Which of the following drugs are used in treatment of SVT ?

N Engl J Med 2006;354:1039-51

- A. Intravenous Procainamide
- B. Intravenous Ibutilide
- C. Intravenous Propafenone
- D. All of the above

498 Danger of radiofrequency catheter ablation of accessory pathway in SVT is ?

N Engl J Med 2006;354:1039-51

- A. Atrioventricular block that requires pacemaker therapy
- B. Damage to an artery, bleeding, arteriovenous fistula
- C. Coronary venous thrombosis
- D. All of the above

499 Danger of radiofrequency catheter ablation of accessory pathway in SVT is ?

N Engl J Med 2006;354:1039-51

- A. Pulmonary embolism
- B. Myocardial perforation
- C. Valvular damage
- D. All of the above

500 Characteristic of radiofrequency current used for catheter ablation of accessory pathways in SVT is ?

N Engl J Med 2006;354:1039-51

- A. Low-voltage, high-frequency form of electrical energy
- B. High-voltage, low-frequency form of electrical energy
- C. High-voltage, high-frequency form of electrical energy
- D. Low-voltage, low-frequency form of electrical energy

Catheter ablation, directed at elimination or modification of slow pathway conduction, is very effective in permanently eliminating AVNRT.

501 Which of the following about atrioventricular nodal reentrant tachycardia is false ?

Harrison's 18th Ed. 1888

- A. Most common paroxysmal regular SVT
- B. More common in men than in women
- C. Typically manifests in II to IV decades of life
- D. Occur in the absence of structural heart disease

AV nodal reentrant tachycardia is the most common paroxysmal regular SVT. It is more common in women than in men (>2:1). Typically manifests in second to fourth decades of life and tends to occur in the absence of structural heart disease, it is usually well tolerated.

502 "Frog sign" is best related with ?

Harrison's 18th Ed. 1888

- A. Arterial pulse
- B. Jugular veins
- C. Abdominal pulsations
- D. Nail beds

503 "Frog sign" is best related with ?

Harrison's 18th Ed. 1888

- A. Atrial fibrillation
- B. Atrioventricular nodal reentrant tachycardia

- C. Ventricular tachycardia
- D. All of the above

In atrioventricular nodal reentrant tachycardia, neck pulsations are felt due to simultaneous atrial & ventricular contraction, and a "frog sign" is identified on physical examination during arrhythmia.

504 Which of the following about AVNRT is false ?

Harrison's 18th Ed. 1888

- A. Fast pathway has a longer refractory period
- B. Slow pathway lower in the AV node region
- C. During sinus rhythm, conduction is through both pathways
- D. None of the above

Fast pathway is in superior part of AV node and has a longer refractory period, whereas pathway lower in AV node region conducts more slowly and has a shorter refractory period. During sinus rhythm, conduction is through both pathways.

505 Which of the following occurs in a typical AV nodal reentrant tachycardia ?

Harrison's 18th Ed. 1888

- A. Repetitive activation up slow and down fast pathway
- B. Repetitive activation down slow and up fast pathway
- C. Repetitive activation down slow pathway
- D. Repetitive activation down fast pathway

Repetitive activation down the slow and up the fast pathway results in typical AV nodal reentrant tachycardia.

506 Which of the following statements about SVT is false ?

Harrison's 18th Ed. 1888

- A. Most common cause is AV nodal reentrant tachycardia
- B. More commonly observed in women
- C. Presents as regular narrow QRS complex tachycardia @ 120 to 250 bpm
- D. APCs that initiate the SVT has a normal PR interval

APC initiating AVNRT is characteristically followed by a long PR interval consistent with conduction via the slow pathway.

507 Which of the following about sinus tachycardia is false ?

N Engl J Med 2012;367:1438-48

- A. Sudden in onset and recession
- B. Regular
- C. Rate < 220 bpm minus the patient's age
- D. P waves precede the QRS complex

Sinus tachycardia is gradual in onset and recession. The heart rate is regular and classically does not exceed 220 beats per minute minus the patient's age. In sinus tachycardia, P waves precede the QRS complex.

508 Atrial flutter results from a reentrant circuit around ?

N Engl J Med 2012;367:1438-48

- A. Mitral valve
- B. Tricuspid valve
- C. Aortic valve
- D. Pulmonary valve

Atrial flutter, the second most common pathologic supraventricular tachycardia, results from a reentrant circuit around the tricuspid valve in the right atrium.

509 Which of the following parameter helps distinguish atrial flutter from other supraventricular tachycardias ?

N Engl J Med 2012;367:1438-48

- A. Regularity
- B. Rate
- C. Blood pressure
- D. Jugular venous pulsations

Atrial flutter is an organized regular rhythm that is characterized by an atrial rate of 280 to 300 beats per minute and with 2:1 conduction in AV node results in a ventricular rate of 140 to 150 beats per minute. Flutter waves are usually obscured by T waves, making the surface ECG tracing for this tachycardia difficult to distinguish from that of other supraventricular tachycardias. However, a heart rate of 150 beats per minute is highly suggestive of this tachyarrhythmia.

510 Which of the following occurs more frequently in the pediatric population ?

N Engl J Med 2012;367:1438-48

- A. Atrioventricular nodal reentrant tachycardia
- B. Atrioventricular reciprocating tachycardia
- C. Atrial tachycardia
- D. Atrial flutter

Atrioventricular nodal reentrant tachycardia is most common in persons >20 years of age, whereas atrioventricular reciprocating tachycardia occurs more frequently in pediatric population.

511 Atrioventricular nodal reentrant tachycardia is caused by a reentrant loop that involves atrioventricular node and ?

N Engl J Med 2012;367:1438-48

- A. Atrial tissue
- B. Ventricular tissue
- C. Bundle of His
- D. Fascicles

Atrioventricular nodal reentrant tachycardia is caused by a reentrant loop that involves the atrioventricular node and the atrial tissue.

512 Regular supraventricular tachycardias include all except ?

N Engl J Med 2012;367:1438-48

- A. Atrial tachycardia (AT)
- B. Atrioventricular nodal reentrant tachycardia (AVNRT)
- C. Atrioventricular reciprocating tachycardia (AVRT)
- D. Multifocal atrial tachycardia (MAT)

Regular supraventricular tachycardias include sinus tachycardia, atrial flutter (AFL), atrioventricular nodal reentrant tachycardia (AVNRT), atrioventricular reciprocating tachycardia (AVRT), and atrial tachycardia (AT). Orthodromic AVRT is more common than antidromic AVRT. Irregular supraventricular tachycardias include atrial fibrillation (AF), AFL when it occurs in a patient with variable AV block, multifocal atrial tachycardia (MAT) & sinus rhythm with multiple atrial premature beats.

513 Which of the following arrhythmias are seen with bypass tracts ?

N Engl J Med 2012;367:1438-48

- A. Orthodromic AV reentry
- B. Antidromic AV reentry
- C. Wide irregular QRS complex (atrial fibrillation)
- D. All of the above

Three arrhythmias are seen with bypass tracts: a narrow regular QRS complex (orthodromic; conduction down the atrioventricular node and retrograde conduction through the bypass tract), a wide regular QRS complex (antidromic; conduction down the bypass tract and retrograde conduction through the atrioventricular node), and a wide irregular QRS complex (atrial fibrillation).

514 Heart rate regularity is defined as beat-to-beat timing variation of less than ?

N Engl J Med 2012;367:1438-48

- A. 5 %
- B. 10 %

- C. 15 %
D. 20 %

Regularity is defined as variation of less than 10% in beat-to-beat timing, but most regular tachycardias actually vary by less than 5%.

515 P waves immediately precede the QRS complex in all except ?

N Engl J Med 2012;367:1438-48

- A. Atrial tachycardia
B. Multifocal atrial tachycardia
C. Atrioventricular nodal reentrant tachycardia
D. Multiple atrial premature contractions

P waves immediately precede the QRS complex in sinus tachycardia, atrial tachycardia, multifocal atrial tachycardia, and multiple atrial premature contractions. P waves follow the QRS complex in atrioventricular nodal reentrant tachycardia and atrioventricular reciprocating tachycardia.

516 Which of the following is a wide-complex tachycardia ?

N Engl J Med 2012;367:1438-48

- A. Ventricular tachycardia
B. Ventricular fibrillation
C. Torsades de pointes
D. All of the above

Wide-complex tachycardias are caused by ventricular arrhythmia (ventricular tachycardia, ventricular fibrillation, and torsades de pointes or polymorphic ventricular tachycardia) or supraventricular tachycardias with aberrant conduction resulting from disease in His-Purkinje system (left or right bundle-branch block), a bypass tract (Wolff-Parkinson-White syndrome), with depolarization of ventricle from bypass tract; and a ventricular paced rhythm from a pacemaker.

517 Vagomimetic maneuvers include ?

N Engl J Med 2012;367:1438-48

- A. Carotid sinus massage
B. Valsalva maneuver
C. Immersion of face in cold water
D. All of the above

Vagal maneuvers include Valsalva maneuver, carotid sinus massage, bearing down, and immersion of the face in ice water. They increase vagal tone and block the atrioventricular node.

518 Adenosine terminates which of the following ?

N Engl J Med 2012;367:1438-48

- A. Atrioventricular nodal reentrant tachycardias
B. Atrioventricular reciprocating tachycardias
C. Atrial tachycardias
D. All of the above

Adenosine, a very short-acting endogenous nucleotide that blocks atrioventricular nodal conduction, terminates nearly all atrioventricular nodal reentrant tachycardias and atrioventricular reciprocating tachycardias as well as up to 80% of atrial tachycardias.

519 Adenosine should not be given in ?

N Engl J Med 2012;367:1438-48

- A. Regular wide-complex tachycardias
B. Irregular wide-complex tachycardias
C. Atrioventricular nodal reentrant tachycardias
D. Atrioventricular reciprocating tachycardias

Adenosine is also useful in the differential diagnosis and treatment of wide-complex tachycardias, but it should be given only when these tachycardias are regular, since irregular wide-complex tachycardias may be rendered unstable after the administration of adenosine.

520 Arrhythmias that cause which of the following require urgent electrical cardioversion ?

N Engl J Med 2012;367:1438-48

- A. Hypotension
B. Heart failure
C. Coronary ischemia
D. All of the above

Arrhythmias causing hemodynamic instability (hypotension, heart failure, or coronary ischemia) require urgent electrical cardioversion.

521 If hemodynamic compromise is present, which of the following is preferred to terminate atrioventricular nodal reentrant tachycardia ?

Harrison's 18th Ed. 1888

- A. Intravenous adenosine
B. Intravenous beta blockade
C. Intravenous calcium channel therapy
D. R-wave synchronous DC cardioversion (100 - 200 J)

If hemodynamic compromise is present, R-wave synchronous DC cardioversion using 100-200 J can terminate atrioventricular nodal reentrant tachycardia.

522 Which of the following drugs slow conduction in the antegrade slow pathway in atrioventricular nodal reentrant tachycardia ?

Harrison's 18th Ed. 1888

- A. Digitalis
B. Beta blockers
C. Calcium channel blockers
D. All of the above

AVNRT prevention may be achieved with drugs that slow conduction in the antegrade slow pathway, such as digitalis, beta blockers, and calcium channel blockers.

523 Which of the following drugs is useful in preventing exercise-precipitated atrioventricular nodal reentrant tachycardia ?

Harrison's 18th Ed. 1888

- A. Digitalis
B. Beta blockers
C. Calcium channel blockers
D. All of the above

In patients who have a history of exercise-precipitated AVNRT, use of beta blockers frequently eliminates symptoms.

524 Which of the following drugs slow conduction in the antegrade slow pathway in atrioventricular nodal reentrant tachycardia ?

Harrison's 18th Ed. 1888

- A. Digitalis
B. Beta blockers
C. Calcium channel blockers
D. Flecainide

In patients who do not respond to drug therapy directed at antegrade slow pathway, treatment with class IA or IC agents directed at altering conduction of the fast pathway may be considered.

525 Which of the following about AV junctional complexes is false?

Harrison's 16th Ed. 1342

- A. Site of origin is AV node
B. Associated with digitalis intoxication
C. Can conduct both antegradely and retrogradely
D. May cause cannon 'a' waves

The site of origin of AV junctional complexes is in the bundle of His, since the normal AV node in vivo possesses no automaticity.

526 Which of the following arrhythmia may be a manifestation of digoxin toxicity ?

Harrison's 18th Ed. 1888

- A. Multifocal atrial tachycardia
- B. Focal atrial tachycardias
- C. AV junctional tachycardias
- D. AV nodal reentrant tachycardia

527 Junctional tachycardia due to abnormal automaticity can be treated pharmacologically with ?

Harrison's 18th Ed. 1888

- A. Digitalis
- B. Beta blockers
- C. Calcium channel blockers
- D. All of the above

Junctional tachycardia due to abnormal automaticity can be treated with beta blockers.

528 Which of the following is false for carotid sinus massage ?

Harrison's 16th Ed. 1344

- A. Not performed in patients with carotid arterial bruits
- B. Massage one carotid bulb at a time
- C. Performed by applying firm pressure just underneath the angle of jaw for up to 10 seconds
- D. Patient should be supine with neck extended

529 Which of the following statements regarding accessory pathways (APs) is correct ?

- A. APs connect the atria with the ventricles
- B. There may be no delta wave in the ECG of concealed APs
- C. More than 50% of APs are located at the left free wall
- D. All of the above

530 The most common accessory pathway (AP) connects which of the following ?

Harrison's 18th Ed. 1889

- A. Left atrium to left ventricle
- B. Right atrium to right ventricle
- C. Left atrium to right ventricle
- D. Right atrium to left ventricle

The most common AP connects the left atrium to the left ventricle, followed by posterior septal, right free wall, and anterior septal APs.

531 Which of the following about atriofascicular accessory pathways is false ?

Harrison's 18th Ed. 1889

- A. Originate from the right atrium
- B. Conduct more slowly
- C. Have decremental antegrade conduction
- D. None of the above

532 Which of the following best relates to normal PR interval with a delta wave in ECG ?

Harrison's 18th Ed. 1889

- A. James fibers
- B. Bundle of Kent
- C. Mahaim fibers
- D. Brechenmacher fibers

There are several types of accessory pathways. The classic accessory pathway is the AV bypass tract or bundle of Kent in WPW that directly connects atrial and ventricular myocardium, bypassing the AV node/His-Purkinje system. James fibers or atrionodal tracts, connect atrium to distal or compact AV node. Brechenmacher fibers (atrio-Hisian tracts) connect the atrium to His bundle. Mahaim fibers connect the AV node to the fascicles. Mahaim fibers typically manifest a normal PR interval with a delta wave.

533 Wolff-Parkinson-White syndrome is best related to ?

Harrison's 18th Ed. 1889

- A. James fibers
- B. Bundle of Kent
- C. Mahaim fibers
- D. Brechenmacher fibers

Preexcitation through an AV bypass tract, the bundle of Kent, produces the ECG pattern described by Wolff, Parkinson, and White in 1930. Bundle of Kent in WPW directly connects atrial & ventricular myocardium, bypassing the AV node/His-Purkinje system. AV conduction is nondecremental and more rapid through the accessory pathway than through the AV node, a difference that is increased at fast heart rates. Decremental conduction means increase in conduction time of the impulse propagating through the AV node as the cycle length shortens (heart rate increased).

534 Classic electrocardiographic triad in WPW syndrome includes all except ?

N Engl J Med 2003;349:1787

- A. Short PR interval
- B. Slurred QRS upstroke (delta wave)
- C. Prolonged QRS complex
- D. Prolonged QT interval

In WPW syndrome, classic electrocardiographic triad is a short PR interval, a slurred QRS upstroke (delta wave), and a prolonged QRS complex.

535 Most common arrhythmia associated with WPW syndrome is ?

N Engl J Med 2003;349:1787

- A. Atrioventricular reciprocating tachycardia
- B. Atrioventricular nodal reentrant tachycardia
- C. Atrial tachycardia
- D. Multifocal atrial tachycardia

Most common arrhythmia associated with WPW syndrome is atrioventricular reciprocating tachycardia.

536 The following are ECG features of WPW syndrome except ?

- A. Presence of delta wave
- B. Shortened PR interval of < 0.12 seconds
- C. PR depression
- D. Prolonged QRS interval of > 0.12 seconds

537 Which of the following are known conditions associated with WPW syndrome ?

- A. ST elevation myocardial infarction
- B. Ebstein anomaly
- C. Acute pericarditis
- D. Marfan's syndrome

538 The WPW ECG may mimic the following ?

- A. Left ventricular hypertrophy
- B. Right ventricular hypertrophy
- C. Bundle branch block
- D. All of the above

539 AV bypass tract in ventricular preexcitation are composed of ?

Harrison's 16th Ed. 1350

- A. Atrial-like muscle
- B. Ventricular-like muscle
- C. Specialized conduction tissue
- D. All of the above

540 AV bypass tracts are associated with which of the following congenital abnormalities ?

Harrison's 16th Ed. 1350

- A. ASD
- B. VSD
- C. TOF
- D. Ebstein's anomaly

541 Which of the following is not a feature of Wolff-Parkinson-White (WPW) syndrome ?

Harrison's 16th Ed. 1350

- A. Short PR interval (< 0.12 sec.)
- B. Slurred upstroke of QRS complex (delta wave)
- C. Wide QRS complex
- D. Prolonged QT interval

542 Which of the following is not true regarding Wolff-Parkinson-White syndrome ?

Harrison's 16th Ed. 1350

- A. During PSVT in WPW, impulse is conducted antegradely over normal AV system and retrogradely through bypass tract
- B. Atrial flutter and AF are common
- C. Ventricular responses during atrial flutter or fibrillation is unusually rapid and may cause VF
- D. Quinidine or flecainide slow conduction and increase refractoriness primarily of the AV node

543 Which of the following statements about VPCs is false ?

Harrison's 18th Ed. 1890

- A. May occur in up to 80 % of patients with previous MI
- B. On ECG show wide (usually > 0.12 s), bizarre QRS complexes not preceded by P waves
- C. When they arise in specialized conduction system (fascicles), they may be < 0.12 s in duration
- D. They result in a fully compensatory pause

VPCs are associated with a "fully compensatory pause" i.e. duration between last QRS before PVC and next QRS complex is equal to twice the sinus rate. VPC produces slow ventricular activation and a wide QRS complex that is typically >140 ms in duration.

544 Which of the following statements about VPCs is false ?

Harrison's 18th Ed. 1890

- A. When fixed coupling is not present and interval between VPCs has a common denominator, ventricular parasystole is said to be present
- B. Trigeminy means two sinus beats followed by a VPC
- C. Two successive VPCs are termed pairs or couplets
- D. ≥ 3 consecutive VPCs are termed ventricular tachycardia when the rate exceeds 160 beats/min

VPCs may occur in patterns of bigeminy, in which every sinus beat is followed by a VPC, or trigeminy, in which two sinus beats are followed by a VPC. VPCs may have different morphologies

and are thus referred to as multiformed. Two successive VPCs are termed pairs or couplets. Three or more consecutive VPCs are termed VT when the rate is >100 beats/min.

545 Which of the following statements about VPCs is false ?

Harrison's 18th Ed. 1890

- A. Ventricular impulses are never conducted retrogradely to atrium
- B. VPC that does not produce retrograde concealed conduction and fails to influence oncoming sinus impulse is termed interpolated VPC
- C. Antiarrhythmic agents can produce lethal arrhythmias
- D. Prophylactic antiarrhythmic therapy is recommended only for young patients with complicated MI

VPC typically does not conduct to the atrium. Occasionally VPC can occur early enough & conduct retrograde to atrium to reset the sinus node. Pause that results will be less than compensatory. VPCs that fail to influence the oncoming sinus impulse are termed interpolated VPCs.

546 QRS duration of a ventricular premature complex (VPC) is ?

Harrison's 18th Ed. 1890

- A. > 110 ms
- B. > 120 ms
- C. > 130 ms
- D. > 140 ms

A VPC has a wide QRS complex that is typically >140 ms in duration.

547 Accelerated idioventricular rhythm (AIVR) has overlap features with ?

Harrison's 18th Ed. 1891

- A. Monomorphic VT
- B. Polymorphic VT
- C. Slow VT
- D. None of the above

By definition there is an overlap between AIVR and "slow" VT.

548 Which of the following about AIVR is false ?

Harrison's 18th Ed. 1891

- A. Heart rate ranges from 60 to 120 beats/min
- B. Occurs in acute MI
- C. Usually transient
- D. Treatment consists of β blockers

AIVR refers to a ventricular rhythm that is characterized by three or more complexes at a rate >40 and <120 beats/minute due to abnormal automaticity. Transient AIVR is frequently seen in acute myocardial infarction, cocaine intoxication, acute myocarditis, digoxin intoxication & postoperative cardiac surgery. Sustained AIVR is seen in acute MI & postoperatively. Treatment consists of atropine and atrial pacing.

549 Sustained ventricular tachycardia is defined as VT that persists for ?

Harrison's 18th Ed. 1891

- A. > 10 seconds
- B. > 15 seconds
- C. > 20 seconds
- D. > 30 seconds

A time duration of 30 seconds is frequently used to distinguish sustained from nonsustained VT. Hemodynamically unstable VT that requires termination before 30 seconds or VT that is terminated by therapy from an implantable defibrillator is also typically classified as sustained.

550 Which of the following is not true for sustained VT ?

Harrison's 16th Ed. 1351

- A Almost always symptomatic
- B Mostly associated with marked hemodynamic compromise
- C Almost always leads to development of myocardial ischemia
- D Acute ischemia is responsible for most recurrent episodes of sustained uniform VT

551 The heart rate in ventricular flutter usually is ?

Harrison's 18th Ed. 1891

- A 100 to 150 beats/minute
- B 150 to 300 beats/minute
- C 300 to 450 beats/minute
- D 450 to 600 beats/minute

Ventricular flutter appears as a sine wave on the ECG and has a rate of >250 beats/minute.

552 It is not possible to assign a specific morphology to which of the following arrhythmia ?

Harrison's 18th Ed. 1891

- A Atrial flutter
- B Ventricular flutter
- C Torsades de pointes
- D WPW syndrome with AF

A rapid rate with sine wave oscillations of ventricular flutter make it impossible to assign it a specific morphology and in some cases to distinguish it from rapid VT.

553 VT that shows an alternation in QRS axis is called ?

Harrison's 16th Ed. 1351

- A Monomorphic VT
- B Polymorphic VT
- C Bidirectional tachycardia
- D Torsades de pointes

554 Characteristics ECG findings that suggest VT are all except ?

Harrison's 18th Ed. 1892, Figure 233-10, Table 233-6

- A QRS complex > 0.20 seconds
- B AV dissociation
- C Inferior QRS frontal plane axis
- D Concordance of QRS pattern in all precordial leads

Ventricular tachycardia on ECG shows AV dissociation, wide QRS >200 ms, superior frontal plane axis, slurring of initial portion of QRS, and large S wave in V₆.

555 Which of the following always produce hemodynamic collapse if allowed to continue ?

Harrison's 18th Ed. 1891

- A Polymorphic ventricular arrhythmias
- B Ventricular flutter
- C Ventricular fibrillation
- D All of the above

Polymorphic ventricular arrhythmias, ventricular flutter, and VF always produce hemodynamic collapse if allowed to continue.

556 Characteristics ECG findings that suggest VT are all except ?

Harrison's 18th Ed. 1892

- A Superior and rightward QRS frontal plane axis
- B Bizarre QRS complex mimicking LBBB or RBBB QRS
- C Slurring of the initial portion of QRS

- D AV dissociation

VT on ECG is suggested by presence of QRS duration >140 ms in the absence of drug therapy, superior & rightward QRS frontal plane axis, bizarre QRS complex that does not mimic the characteristic QRS pattern associated with LBBB or RBBB, and slurring of initial portion of QRS.

557 Repeated VT episodes requiring defibrillation is called ?

Harrison's 18th Ed. 1893

- A VT storm
- B VT paroxysm
- C VT battle
- D VT flow

Repeated VT episodes requiring external cardioversion/defibrillation or repeated appropriate ICD shock therapy are referred to as VT storm.

558 Which of the following should be considered for polymorphic VT storm ?

Harrison's 18th Ed. 1893

- A Intravenous beta blocker
- B Intravenous calcium channel blocker
- C Intravenous nitroglycerine
- D Intravenous digoxin

Intravenous beta blockade therapy should be considered for polymorphic VT storm.

559 Which of the following can prevent recurrences in patients with recurrent monomorphic VT ?

Harrison's 18th Ed. 1893

- A IV lidocaine
- B IV procainamide
- C IV amiodarone
- D Any of the above

In patients with recurrent monomorphic VT, acute IV administration of lidocaine, procainamide, or amiodarone can prevent recurrences.

560 VT in the absence of structural heart disease is called ?

Harrison's 18th Ed. 1894

- A Functional VT
- B Idiopathic VT
- C Casual VT
- D Benign VT

VT in the absence of structural heart disease is called idiopathic VT.

561 Which of the following about idiopathic outflow tract VT is false ?

Harrison's 18th Ed. 1894

- A ~80% of outflow tract VTs originate in LV
- B Not associated with SCD
- C Vagal maneuvers terminate them
- D Adenosine & beta blockers terminate them

~80% of outflow tract VTs originate in RV & ~20% in LV outflow tract regions.

562 Which of the following about idiopathic outflow tract VT is false ?

Harrison's 18th Ed. 1894

- A Produces monophasic R waves in leads II, III & aVF
- B Typically occur as nonsustained bursts of VT
- C Cycle length oscillations are common
- D More commonly in men

Acute medical therapy for idiopathic outflow tract VT is rarely required because the VT is hemodynamically tolerated and is typically nonsustained. Intravenous beta blockers frequently terminate the tachycardia. They are more common in women.

563 Which of the following can terminate the idiopathic outflow tract ventricular tachycardia ?

Harrison's 18th Ed. 1894

- A. IV lidocaine
- B. IV procainamide
- C. IV amiodarone
- D. IV beta blockers

Intravenous beta blockers frequently terminate idiopathic outflow tract ventricular tachycardia.

564 Verapamil is least effective / contraindicated in which of the following ?

Harrison's 18th Ed. 1895

- A. Idiopathic LV septal VT
- B. Ventricular tachycardia
- C. Accessory pathway mediated tachycardias
- D. Atrial fibrillation

Most VTs do not respond to carotid sinus massage, Valsalva maneuver or adenosine administration. IV administration of verapamil and/or adenosine is not recommended as a diagnostic test. Verapamil is associated with hemodynamic collapse when administered to patients with structural heart disease and VT.

565 Which of the following is unique in its suppression with verapamil ?

Harrison's 18th Ed. 1895

- A. Idiopathic LV septal VT
- B. VT associated with LV dilated cardiomyopathy
- C. Bundle Branch Reentrant VT
- D. All of the above

Idiopathic LV septal VT responds uniquely to IV verapamil.

566 Most uniform sustained VT associated with LV dilated cardiomyopathy can be mapped to ?

Harrison's 18th Ed. 1895

- A. Mitral valvular region
- B. Tricuspid valvular region
- C. Pulmonary valvular region
- D. All of the above

VT associated with LV dilated cardiomyopathy may be mono- or polymorphic. Myopathic process has a predilection for fibrosis around mitral & aortic valvular regions. Most uniform sustained VT are mapped to these regions.

567 In ECG, bundle branch reentrant VT presents as ?

Harrison's 18th Ed. 1895

- A. Incomplete right bundle block
- B. Incomplete left bundle block
- C. Complete right bundle block
- D. Complete left bundle block

In sinus rhythm, bundle branch reentrant VT presents as an incomplete left bundle block.

568 WPW syndrome is observed in patients with hypertrophic cardiomyopathy associated with which mutation ?

Harrison's 18th Ed. 1895

- A. ACTN2

- B. S135L mutation
- C. PRKAG2 mutation
- D. CRYAB

WPW syndrome is seen in patients with hypertrophic cardiomyopathy associated with PRKAG2 mutations.

569 Infiltrative / Inflammatory & neuromuscular disorders associated with increased ventricular arrhythmia risk include ?

Harrison's 18th Ed. 1896, Table 233-7

- A. Sarcoidosis
- B. Myotonic muscular dystrophy
- C. Kearns-Sayre syndrome
- D. All of the above

570 Infiltrative / Inflammatory & neuromuscular disorders associated with increased ventricular arrhythmia risk include ?

Harrison's 18th Ed. 1896, Table 233-7

- A. Chagas disease
- B. Fabry disease
- C. Amyloidosis
- D. All of the above

571 Infiltrative / Inflammatory & neuromuscular disorders associated with increased ventricular arrhythmia risk include ?

Harrison's 18th Ed. 1896, Table 233-7

- A. Becker's muscular dystrophy
- B. Hemochromatosis
- C. Friedreich's ataxia
- D. All of the above

572 Neuromuscular disorders associated with increased ventricular arrhythmia risk include all except ?

Harrison's 18th Ed. 1896, Table 233-7

- A. Facioscapulohumeral muscular dystrophy
- B. Emery-Dreyfuss muscular dystrophy
- C. Limb-girdle muscular dystrophy
- D. Duchenne's muscular dystrophy

Characteristically, FSH muscular dystrophy does not involve other organ systems. Labile hypertension & nerve deafness is common. Coats' disease (telangiectasia, exudation & retinal detachment) also occurs.

573 Ventricular fibrillation can occur due to ?

Harrison's 16th Ed. 1354

- A. Antiarrhythmic drugs
- B. Torsades de pointes
- C. WPW syndrome with AF
- D. All of the above

IHD is mostly responsible for VF which also occur with antiarrhythmic drugs, TDP and WPW syndrome who develop AF with an extremely rapid ventricular response.

574 Patients who have primary VF within first 48 hours of onset of acute infarction have ?

Harrison's 16th Ed. 1354

- A. Good short-term prognosis
- B. Good long-term prognosis
- C. Poor long-term prognosis
- D. None of the above

Most patients who have primary VF within the first 48 hours of the onset of acute myocardial infarction have a good long-term prognosis, with a very low rate of recurrence or sudden cardiac death.

575 Which of the following is related to arrhythmogenic RV cardiomyopathy/dysplasia (ARVCMD) ?

Harrison's 18th Ed. 1896

- A. Genetically determined
- B. After viral myocarditis
- C. Sporadic
- D. Any of the above

ARVCMD due to a genetically determined dysplastic process or after a suspected viral myocarditis is also associated with VT/VF. Sporadic nonfamilial/nondysplastic form of RV cardiomyopathy is also seen.

576 Epsilon wave is characteristic ECG finding of ?

Harrison's 18th Ed. 1896

- A. Arrhythmogenic RV cardiomyopathy / dysplasia
- B. Brugada Syndrome
- C. Long QT syndrome (LQTS)
- D. Digoxin toxicity

Epsilon wave is the terminal notching of QRS complex & is separated from the QRS complex. It is seen in ARVCMD. Epsilon waves are due to marked delay in ventricular activation in RV free wall near the base of tricuspid & pulmonic valves which undergo extensive fibrosis.

577 In arrhythmogenic RV cardiomyopathy/dysplasia (ARVCMD), ventricles have an excess of ?

Harrison's 18th Ed. 1896

- A. Fat
- B. Glycogen
- C. Mucopolysaccharide
- D. All of the above

MRI in arrhythmogenic RV cardiomyopathy/dysplasia (ARVCMD) shows fatty replacement of the ventricle, thinning of the RV free wall with increased fibrosis, and associated wall motion abnormalities.

578 Echocardiographic finding in arrhythmogenic RV cardiomyopathy/dysplasia (ARVCMD) is ?

Harrison's 18th Ed. 1896

- A. RV enlargement
- B. RV wall motion abnormalities
- C. RV apical aneurysm formation
- D. All of the above

In patients with ARVCMD, echocardiography shows RV enlargement with RV wall motion abnormalities and RV apical aneurysm formation.

579 Which of the following about Naxos disease is false ?

Harrison's 18th Ed. 1896

- A. Arrhythmogenic RV dysplasia
- B. Palmar-plantar keratosis
- C. Parapsoriasis
- D. Woolly hair

Naxos disease consists of arrhythmogenic RV dysplasia with palmar-plantar keratosis & woolly hair with a high risk of SCD in adolescents & young adults.

580 Which of the following about digoxin toxicity is false ?

Harrison's 18th Ed. 1897

- A. Myocardial cell calcium overload

- B. Bidirectional VT from left anterior & posterior fascicles
- C. Narrow QRS right bundle branch configuration
- D. None of the above

The signature VT associated with digoxin toxicity is bidirectional VT due to triggered activity associated with calcium overload resulting from inhibition of Na⁺/K⁺ ATPase by digoxin. Bidirectional VT originates from left anterior & posterior fascicles creating a relatively narrow QRS right bundle branch configuration with beat-to-beat alternating right & left frontal plane QRS axis.

581 Bazett's formula for the calculation of QTc is ?

- A. QT / Square root of PR
- B. QT / Square root of RR
- C. QT x Square root of PR
- D. QT x Square root of RR

QT interval is from the onset of QRS complex to the end of the T wave. Bazett's formula (QT interval is adjusted for heart rate) for the calculation of QTc is QT interval (in seconds) divided by the square root of the RR interval (in seconds).

582 Long QT syndrome (LQTS) was first described by ?

- A. Romano and Ward
- B. Levine and Woodworth
- C. Jervell and Lange-Nielsen
- D. Moss and Schwartz

In 1957, Jervell and Lange-Nielsen first described a family with long QT syndrome (LQTS). The family consisted of unrelated parents and their six children, four of whom were deaf with frequent fainting attacks precipitated by acute emotional arousal and exercise. Three of the four deaf children died suddenly while playing at the ages of 4, 5, and 9 years. In 1963 and 1964, Romano and Ward respectively, reported separate families with QT prolongation in one parent and several children, all of whom possessed normal hearing but experienced recurrent syncope and sudden death (autosomal dominant mode of inheritance). In 1979 Moss and Schwartz established the prospective International LQTS Registry for enrollment and follow-up of proband-identified LQTS families.

583 Syncope in long-QT syndrome is attributed to ?

N Engl J Med 2008;358:169-76

- A. Emotional or physical stress
- B. Electrolyte disturbances
- C. Torsades de pointes
- D. Lack of sleep

Syncope in patients with the long-QT syndrome is generally attributed to the form of polymorphic ventricular tachycardia called torsades de pointes. Death is usually due to ventricular fibrillation.

584 LQT1-specific trigger is ?

N Engl J Med 2008;358:169-76

- A. Emotional stress
- B. Physical stress
- C. Diving and swimming
- D. All of the above

585 Schwartz scoring system for diagnosis of LQTS includes all except ?

N Engl J Med 2008;358:169-76

- A. Genetic information
- B. ECG features
- C. Personal history
- D. Family history

Schwartz scoring system for LQTS includes ECG features, personal & family history, but does not take into account genetic information.

586 Which of the following is not useful in diagnosis of LQTS ?

N Engl J Med 2008;358:169-76

- A. Echocardiography
- B. Holter monitoring
- C. Electrophysiological testing
- D. All of the above

Physical examination, echocardiography, MRI, Holter monitoring and electrophysiological testing show no abnormalities in LQTS.

587 Most powerful predictor of risk in LQTS is ?

N Engl J Med 2008;358:169-76, Harrison's 17th Ed. 1441

- A. QTc duration
- B. Family history
- C. History of syncope
- D. Gender

The most powerful predictor of risk is the QTc duration. Marked lengthening of the QT interval to > 500 ms is clearly associated with a greater arrhythmia risk in patients with the LQTS. In LQT2, females fared worse than their males, while opposite was true in LQT3, and no sex bias occurs in LQT1. Syncope and sudden death are most frequent in childhood and adolescence. The risk of cardiac events is higher in males before puberty and higher in females during adulthood.

588 Which of the following is false about LQT1 ?

Harrison's 18th Ed. 1898

- A. Most common genotypic abnormality in LQTS
- B. QT interval fails to shorten with exercise
- C. T wave is broad
- D. None of the above

589 Which of the following is false about LQT1 ?

Harrison's 18th Ed. 1898

- A. Exercise is the most common trigger for arrhythmias
- B. Respond to beta blocker therapy
- C. Due to mutation in potassium-channel gene (KCNQ1) on chromosome 11
- D. None of the above

590 Which of the following is false about LQT2 ?

Harrison's 18th Ed. 1898

- A. T wave is low amplitude, notched and bifid
- B. Emotional stress /startle triggers arrhythmias
- C. Sleep or auditory stimulation triggers arrhythmias
- D. None of the above

591 Which of the following is false about LQT2 ?

Harrison's 18th Ed. 1898

- A. Risk of syncope & sudden death increased in postpartum period
- B. Respond to beta blocker therapy
- C. Due to a mutation in a potassium-channel gene on chromosome 7 (KCNH2 or HERG)
- D. None of the above

592 Which of the following is false about LQT3 ?

Harrison's 18th Ed. 1898

- A. Due to a mutation in cardiac sodium channel gene on chromosome 3
- B. Late-onset peaked biphasic/asymmetric T waves

C. Prognosis for LQT3 is the poorest of all LQTS

D. None of the above

593 Which of the following is false about LQT3 ?

Harrison's 18th Ed. 1898

- A. Beta blockers are not recommended
- B. Exercise is not restricted in LQT3
- C. QT shortening occurs with mexiletine
- D. None of the above

594 Which of the following is false about LQT3 ?

Harrison's 18th Ed. 1898

- A. Most events in LQT3 patients occur during sleep
- B. LQT3 is caused by a mutation in sodium channel gene on chromosome 3 (SCN5A)
- C. Male patients have worst prognosis in LQT3
- D. None of the above

595 Which of the following do not cause QT prolongation ?

Harrison's 18th Ed. 1898, 1884, Table 233-5

- A. Ibutilide
- B. Sotalol
- C. Lidocaine
- D. Disopyramide

Class IB antiarrhythmic agents (lidocaine) do not cause QT prolongation. Disopyramide, Dofetilide, Ibutilide, Procainamide, Quinidine, Sotalol prolong QT interval prolong QT and may precipitate torsades des pointes.

596 Which of the following prolongs QT interval ?

Harrison's 18th Ed. 1884

- A. Hypocalcemia
- B. Hypothyroidism
- C. Hypokalemia
- D. All of the above

597 Which of the following is a repolarization abnormality ?

- A. Brugada syndrome
- B. Arrhythmogenic right ventricular cardiomyopathy
- C. Short QT syndrome
- D. All of the above

Besides LQTS, other repolarization abnormalities are Brugada syndrome (opposite of LQT3), arrhythmogenic right ventricular cardiomyopathy, & short QT syndrome.

598 In short QT syndrome, QT interval is ?

Harrison's 18th Ed. 1898

- A. < 320 ms
- B. < 340 ms
- C. < 360 ms
- D. < 380 ms

A QT interval < 320 ms is required to establish the diagnosis of Short QT syndrome.

599 Mutations in which of the following gene is the cause of short QT syndrome ?

Harrison's 18th Ed. 1898

- A. HERG
- B. KvLQT1

- C. KCNJ2
- D. Any of the above

Mutations in the HERG, KvLQT1 & KCNJ2 genes cause of Short QT syndrome.

600 Which of the following is a feature of Short QT syndrome ?

Harrison's 18th Ed. 1898

- A. Short PR interval
- B. Flat P waves
- C. Tall and peaked T waves
- D. Prominent U waves

In Short QT syndrome, T waves tends to be tall and peaked especially in leads V2 to V4 and may be interpreted as R waves by an implantable cardioverter-defibrillator. Patients with the syndrome are predisposed to both AF and VF.

601 Which of the following can shorten QT interval ?

- A. Hypercalcemia
- B. Hyperkalemia
- C. Acidosis
- D. All of the above

Conditions that can shorten QT interval include hypercalcemia (with an accompanying prolonged PR interval and a wide QRS complex), hyperkalemia, acidosis, increased vagal tone, after ventricular fibrillation (due to increased intracellular calcium), digitalis use, androgen use. Interestingly, a shorter-than-expected QT interval was noted in patients with chronic fatigue syndrome. Quinidine is helpful.

602 In Brugada syndrome, ST segment elevation in $V_1 - V_3$ may be ?

Harrison's 18th Ed. 1898

- A. Manifest
- B. Transient
- C. Concealed
- D. Any of the above

603 ECG manifestations of Brugada syndrome are provoked with ?

Harrison's 18th Ed. 1898

- A. Ajmaline
- B. Flecainide
- C. Procainamide
- D. All of the above

The major clinical features of autosomal dominant Brugada syndrome include manifest, transient, or concealed ST segment elevation in V_1 to V_3 that can typically be provoked with sodium channel-blocking drugs ajmaline, flecainide, cocaine and procainamide and a risk of polymorphic ventricular arrhythmias.

604 Which of the following is false about Brugada syndrome ?

Harrison's 18th Ed. 1898

- A. Left bundle branch block pattern
- B. ST elevation leads $V_1 - V_3$
- C. Terminal T-wave inversion in leads $V_1 - V_3$
- D. Due to mutation in cardiac sodium channel SCN 5A

In ECG, right bundle-branch block (rSR') and downsloping ST-segment elevation in lead V1 is typical of Brugada syndrome. It is syndrome of RBBB & nonischemic ST-segment elevations.

605 Which of the following is false about Brugada syndrome ?

Harrison's 18th Ed. 1898

- A. Most common in young Asian male
- B. Affected region is RV outflow tract epicardium
- C. Patients do not benefit from beta blocker therapy

- D. Procainamide & flecainide are beneficial

Procainamide & flecainide exacerbate Brugada syndrome.

606 Which of the following is the cause of ST-segment elevation ?

N Engl J Med 2003;349:2128-35

- A. Acute pericarditis
- B. Hyperkalemia
- C. Pulmonary embolism
- D. All of the above

607 ST-segment elevation in normal healthy young men (male pattern) is seen in ?

N Engl J Med 2003;349:2128-35

- A. V1
- B. V2
- C. V3
- D. V4

Concave ST-segment elevation of 1 - 3 mm seen in ~90 % of healthy young men (male pattern) is most marked in V2.

608 ST-segment elevation in early repolarization is seen in ?

N Engl J Med 2003;349:2128-35

- A. V1
- B. V2
- C. V3
- D. V4

ST-segment elevation due to early repolarization is most marked in V4, with notching at J point, tall, upright T waves, reciprocal ST depression in aVR, not in aVL, when limb leads are involved.

609 Which of the following is an ECG feature of acute pericarditis ?

N Engl J Med 2003;349:2128-35

- A. Diffuse ST-segment elevation
- B. Reciprocal ST-segment depression in aVR, not in aVL
- C. PR-segment depression
- D. All of the above

In acute pericarditis, ECG shows diffuse ST-segment elevation (seldom >5 mm), reciprocal ST-segment depression in aVR, not in aVL and PR-segment depression.

610 Which of the following is not an ECG feature of hyperkalemia ?

N Engl J Med 2003;349:2128-35

- A. Widened QRS
- B. Tall, peaked, tented T waves
- C. Low-amplitude or absent P waves
- D. ST segment usually upsloping

In Hyperkalemia, ECG shows widened QRS, tall, peaked, tented T waves, low-amplitude or absent P waves, with ST segment usually downsloping.

611 Which of the following "Channelopathies" can cause Ventricular Fibrillation-Induced Cardiac Arrest ?

N Engl J Med 2005;353:2492-501

- A. Long-QT syndrome
- B. Short-QT syndrome
- C. Brugada syndrome
- D. All of the above

612 Noncardiac causes of Ventricular Fibrillation Induced Cardiac Arrest include ?

N Engl J Med 2005;353:2492-501

- A. Bronchospasm
- B. Sleep apnea
- C. Seizure
- D. All of the above

Noncardiac causes of Ventricular Fibrillation Induced Cardiac Arrest are Respiratory (Bronchospasm, Aspiration, Sleep apnea, Primary pulmonary hypertension, Pulmonary embolism), Metabolic or toxic (Electrolyte disturbances, Medications or drug ingestion, Environmental poisoning, Sepsis) and Neurologic (Seizure, Cerebrovascular accident: intracranial hemorrhage, or ischemic stroke).

613 Which of the following is an ECG marker of abnormality in repolarization ?

N Engl J Med 2001;345:1476

- A. PR-interval dispersion
- B. QT-interval dispersion
- C. J-point dispersion
- D. All of the above

Two ECG markers of abnormalities in repolarization are QT-interval dispersion & T-wave alternans. They identify patients who are at risk for sudden death from arrhythmia. QT-interval dispersion refers to difference between maximal & minimal QT intervals from various leads on standard ECG. T-wave alternans is defined as alternating T-wave amplitude from beat to beat on special ECG recording techniques.

614 Catecholaminergic polymorphic VT is best related to ?

Harrison's 18th Ed. 1899

- A. Ang II type I receptor
- B. B2-Bradykinin receptor
- C. Ryanodine receptor
- D. All of the above

In catecholaminergic polymorphic VT there occurs a mutation of myocardial ryanodine release channel, which creates a "leak" in calcium from sarcoplasmic reticulum (SR). Accumulation of intracellular calcium potentiates delayed afterdepolarizations and triggered activity. Ca^{2+} is released from SR through a Ca^{2+} release channel - ryanodine receptor (RyR2), which controls intracytoplasmic [Ca^{2+}] and leads to local changes in intracellular [Ca^{2+}] called calcium sparks. Regulatory protein, calstabin 2 inhibit RyR2 and thereby release of Ca^{2+} from SR. PKA dissociates calstabin from RyR2, enhancing Ca^{2+} release and thereby myocardial contractility. Excessive plasma catecholamine levels and cardiac sympathetic neuronal release of norepinephrine cause hyperphosphorylation of PKA, leading to calstabin 2-depleted RyR2. The latter depletes SR Ca^{2+} stores and thereby impairs cardiac contraction, leading to heart failure, and also triggers ventricular arrhythmias.

615 Patients of catecholaminergic polymorphic VT may present with ?

Harrison's 18th Ed. 1899

- A. Bidirectional VT
- B. Nonsustained polymorphic VT
- C. Recurrent VF
- D. Any of the above

Patients of catecholaminergic polymorphic VT can manifest bidirectional VT, nonsustained polymorphic VT, or recurrent VF. The arrhythmias are precipitated by exercise & emotional stress. Treatment with beta blockers & ICD implantation is recommended.

616 Which of the following is useful for patients with congenital prolonged QT interval syndrome ?

Harrison's 16th Ed. 1353

- A. β adrenergic blocking agents
- B. Phenytoin
- C. Cervicothoracic sympathectomy
- D. All of the above

617 Vaughan-Williams classification is used to classify ?

Harrison's 16th Ed. 1355

- A. Cardiotonic drugs
- B. Antiarrhythmic drugs
- C. Vasodilator drugs
- D. Vasopressor drugs

618 Which of the following drug does not fit in Vaughan-Williams classification of antiarrhythmic drugs ?

Harrison's 16th Ed. 1355

- A. Ibutilide
- B. Adenosine
- C. Bretylium
- D. Propafenone

Adenosine does not fit into VW classification.

619 Class III antiarrhythmics exert their action through ?

Harrison's 16th Ed. 1355

- A. Cardiac cellular excitatory current
- B. Action potential duration
- C. Automaticity
- D. All of the above

620 Class I and IV antiarrhythmics exert their action through ?

Harrison's 16th Ed. 1355

- A. Cardiac cellular excitatory current
- B. Action potential duration
- C. Automaticity
- D. All of the above

621 Which of the following drug exhibits properties consistent with multiple classes in Vaughan-Williams classification ?

Harrison's 16th Ed. 1355

- A. Quinidine
- B. Amiodarone
- C. Mexiletine
- D. Propafenone

Amiodarone is consistent with multiple classes.

622 Which of the following is included in 'Genetically determined arrhythmia syndrome' ?

Harrison's 16th Ed. 1355

- A. LQTS
- B. Brugada syndrome
- C. Hypertrophic cardiomyopathy
- D. All of the above

623 Which of the following 'Genetically determined arrhythmia syndromes' have autosomal dominant inheritance ?

Harrison's 16th Ed. 1355

- A. LQTS
- B. Brugada syndrome
- C. Hypertrophic cardiomyopathy
- D. All of the above

624 Torsades de pointes occurs most often in the setting of ?

Harrison's 16th Ed. 1356 Table 214-8

- A. Slow heart rate
- B. QT prolongation
- C. Hypokalemia
- D. All of the above

TDP occurs most often with slow heart rates, QT prolongation & hypokalemia or hypomagnesemia and at the time of conversion from atrial fibrillation to sinus rhythm.

625 Which of the following antiarrhythmic drugs is least likely to produce bradycardia ?

Harrison's 17th Ed. 1430 Table 226-5

- A. Mexiletine
- B. Flecainide
- C. Propafenone
- D. Amiodarone

626 Which of the following is not an adverse effect of amiodarone ?

Harrison's 17th Ed. 1430 Table 226-4

- A. Pulmonary infiltrates
- B. Hepatitis
- C. Photosensitivity
- D. Bronchospasm

627 Which of the following antiarrhythmic drugs can cause 'Lupus erythematosus like syndrome' ?

Harrison's 17th Ed. 1430 Table 226-4

- A. Procainamide
- B. Disopyramide
- C. Lidocaine
- D. Mexiletine

628 Which of the following antiarrhythmic drugs can cause seizures ?

Harrison's 17th Ed. 1430 Table 226-4

- A. Procainamide
- B. Disopyramide
- C. Lidocaine
- D. Mexiletine

629 Which of the following antiarrhythmic drugs can cause congestive heart failure ?

Harrison's 17th Ed. 1430 Table 226-4

- A. Procainamide
- B. Disopyramide
- C. Lidocaine
- D. Mexiletine

630 Which of the following antiarrhythmic drugs can cause taste disturbance ?

Harrison's 17th Ed. 1430 Table 226-4

- A. Procainamide
- B. Disopyramide
- C. Propafenone
- D. Sotalol

631 Who, from the following, was one of the inventors of cardiac defibrillator ?

N Engl J Med 2001;344:1311

- A. Mickey Isenberg
- B. Bardy GH
- C. Claude Beck
- D. Terry Mengert

Claude Beck is one of the inventors of cardiac defibrillation.

632 The first intervention in the "chain of survival" is ?

N Engl J Med 2001;344:1311

- A. Rapid access
- B. Rapid cardiopulmonary resuscitation
- C. Rapid defibrillation
- D. Rapid advanced care

The sequence of rapid access, rapid cardiopulmonary resuscitation, rapid defibrillation, and rapid advanced care is termed the chain of survival.

633 In cardiopulmonary resuscitation, chest compression should be administered in the center of the chest on the ?

N Engl J Med 2001;344:1311

- A. Upper half of the sternum
- B. Middle of the sternum
- C. Lower half of the sternum
- D. Any of the above

In cardiopulmonary resuscitation, chest compression should be administered in the center of the chest on the lower half of the sternum.

634 In cardiopulmonary resuscitation in adults, the depth of chest compression should be ?

N Engl J Med 2001;344:1311

- A. 2 to 3 cm
- B. 3 to 4 cm
- C. 4 to 5 cm
- D. 5 to 6 cm

In CPR in adults, the depth of chest compression should be 4 to 5 cm in adults.

635 In cardiopulmonary resuscitation in adults, the rate of chest compression should be approximately ?

N Engl J Med 2001;344:1311

- A. 30 per minute
- B. 50 per minute
- C. 75 per minute
- D. 100 per minute

636 In cardiopulmonary resuscitation performed by two persons, the ratio of compressions to breaths is ?

N Engl J Med 2001;344:1311

- A. 10 : 1
- B. 10 : 2
- C. 15 : 1
- D. 15 : 2

When cardiopulmonary resuscitation is performed by two persons, the ratio of chest compressions to breaths remains 15:2 with pause during ventilations. After endotracheal intubation, the ratio should be five compressions to one ventilation, and there should be no pause in chest compressions for the ventilatory breath.

637 In ventricular fibrillation, initial shock with a monophasic wave-form defibrillator should be ?

N Engl J Med 2001;344:1311

- A. 100 J
- B. 200 J
- C. 300 J
- D. 360 J

When a monophasic wave-form defibrillator is used for ventricular fibrillation, the initial shock should be 200 J. If the arrhythmia persists, a second shock of 200 to 300 J should be given, followed by a third shock of 360 J if still necessary. All three shocks should be given in quick succession.

638 Paddle diameter for external cardioversion is ?

Harrison's 16th Ed. 1356

- A. 10 cm
- B. 12 cm
- C. 18 cm
- D. 24 cm

639 One paddle during external cardioversion is placed at ?

Harrison's 16th Ed. 1356

- A. Fourth ICS, midclavicular line
- B. Fifth ICS, midclavicular line
- C. Fourth ICS, left anterior axillary line
- D. Fifth ICS, left anterior axillary line

640 One paddle during external cardioversion is placed at ?

Harrison's 16th Ed. 1356

- A. Right parasternally at the level of first rib
- B. Right parasternally at the level of second rib
- C. Right parasternally at the level of third rib
- D. Right parasternally at the level of fourth rib

Chapter 234. Heart Failure and Cor Pulmonale

641 What percentage of patients who develop Heart failure (HF) have normal or preserved EF ?

Harrison's 18th Ed. 1901

- A. 10 %
- B. 20 %
- C. 35 %
- D. 50 %

Epidemiologic studies show that approximately one-half of patients who develop HF have a normal or preserved EF (EF 40 - 50%) i.e. diastolic failure.

642 Which of the following is a cardiac cytoskeletal protein ?

Harrison's 18th Ed. 1901

- A. Desmin
- B. Myosin
- C. Vinculin
- D. All of the above

643 Which of the following is not a cardiac cytoskeletal protein ?

Harrison's 18th Ed. 1901

- A. Desmin

- B. Myosin
- C. Vinculin
- D. Laminin

Cytoskeletal proteins include desmin, cardiac myosin & vinculin. Laminin is a nuclear membrane protein.

644 Which of the following condition does not lead to HF in a normal heart ?

Harrison's 18th Ed. 1902

- A. Hypertension
- B. Infiltrative disorders
- C. Chagas' disease
- D. Arteriovenous fistula

Conditions that lead to a high cardiac output like arteriovenous fistula and anemia seldom lead to HF in a normal heart.

645 In heart failure, which of the following compensatory mechanisms is activated after an index event ?

Harrison's 18th Ed. 1902

- A. Adrenergic nervous system
- B. Renin-angiotensin-aldosterone system
- C. Cytokine system
- D. All of the above

Heart failure begins after an index event produces an initial decline in the heart's pumping capacity. After this initial decline in pumping capacity, a compensatory mechanisms are activated that includes adrenergic nervous system, renin-angiotensin-aldosterone system and cytokine system.

646 Which of the following is a vasodilatory molecule ?

Harrison's 18th Ed. 1902

- A. Atrial and brain natriuretic peptides (ANP & BNP)
- B. Prostaglandins (PGE2 & PGI2)
- C. Nitric oxide (NO)
- D. All of the above

In HF, there is activation of a family of compensatory vasodilatory molecules like atrial & brain natriuretic peptides (ANP & BNP), prostaglandins (PGE2 & PGI2) and nitric oxide (NO), that oppose excessive peripheral vascular vasoconstriction.

647 Baroreceptors are located in which of the following locations ?

Harrison's 18th Ed. 1903, Figure 234-2

- A. Left ventricle
- B. Carotid sinus
- C. Aortic arch
- D. All of the above

High-pressure baroreceptors are located in left ventricle, carotid sinus and aortic arch.

648 Which of the following mechanism may be responsible in the development of HF with preserved EF ?

Harrison's 18th Ed. 1903

- A. Diastolic dysfunction
- B. Increased vascular stiffness
- C. Impaired renal function
- D. All of the above

649 Which of the following contribute to LV remodeling ?

Harrison's 18th Ed. 1903

- A. Myocyte hypertrophy
- B. Altered contractile properties of myocyte

- C. Progressive loss of myocytes
- D. All of the above

Adaptive changes within the myocardium is collectively referred to as LV remodeling. LV remodeling is a result of myocyte hypertrophy, altered contractile properties of myocyte, progressive loss of myocytes through necrosis, apoptosis, and autophagic cell death, beta-adrenergic desensitization, abnormal myocardial energetics and metabolism and reorganization of extracellular matrix (organized structural collagen around myocytes being replaced by interstitial collagen matrix that is unable to provide structural support to myocytes).

650 Which of the following act as a biologic stimuli in LV remodeling ?

Harrison's 18th Ed. 1904

- A. Mechanical stretch of myocyte
- B. Circulating neurohormones
- C. Circulating inflammatory cytokines
- D. All of the above

Biologic stimuli leading to LV remodeling include mechanical stretch of myocyte, circulating neurohormones (norepinephrine, angiotensin II), inflammatory cytokines (tumor necrosis factor), peptides and growth factors (endothelin) and reactive oxygen species (superoxide).

651 Which of the following is best related to a failing cardiac myocyte ?

Harrison's 18th Ed. 1904

- A. NCK-adaptor protein
- B. SERCA₂A
- C. CD2-associated protein (CD2AP)
- D. Giant cell line-derived neutrophilic factor (GDNF)

Changes that regulate excitation-contraction include decreased function of sarcoplasmic reticulum Ca²⁺ adenosine triphosphatase (SERCA2A), resulting in decreased calcium uptake into SR, and hyperphosphorylation of ryanodine receptor, leading to calcium leakage from SR.

652 Left ventricular remodeling refers to changes in which of the following ?

Harrison's 18th Ed. 1904

- A. LV mass
- B. LV volume
- C. LV shape
- D. All of the above

Left ventricular remodeling refers to changes in LV mass, volume, and shape and the composition of heart that occur after cardiac injury and/or abnormal hemodynamic loading conditions.

653 Dyspnea in HF is best related to ?

Harrison's 18th Ed. 1904

- A. Juxtacapillary J receptors
- B. Juxtacapillary K receptors
- C. Juxtacapillary L receptors
- D. Juxtacapillary M receptors

Most important mechanism of dyspnea in HF is pulmonary congestion with accumulation of interstitial or intra-alveolar fluid, which activates juxtacapillary J receptors, which in turn stimulate the rapid, shallow breathing characteristic of cardiac dyspnea.

654 Dyspnea in HF may become less frequent with the onset of ?

Harrison's 18th Ed. 1904

- A. Mitral regurgitation
- B. Tricuspid regurgitation
- C. Aortic regurgitation
- D. Pulmonary regurgitation

Dyspnea in HF may become less frequent with the onset of right ventricular (RV) failure and tricuspid regurgitation.

655 Which of the following is a symptom of HF ?

Harrison's 18th Ed. 1904

- A. Nocturia
- B. Nocturnal cough
- C. Early satiety
- D. All of the above

656 Orthopnea is caused due to redistribution of fluid from ?

Harrison's 18th Ed. 1904

- A. Coronary circulation
- B. Pulmonary circulation
- C. Splanchnic circulation
- D. Cerebral circulation

Orthopnea (dyspnea occurring in recumbent position), results from redistribution of fluid from splanchnic circulation and lower extremities into central circulation during recumbency, with a resultant increase in pulmonary capillary pressure.

657 In HF, paroxysmal nocturnal dyspnea (PND) occurs how many hours after the patient retires ?

Harrison's 18th Ed. 1904

- A. 15 - 30 minutes
- B. 1 - 3 hours
- C. 3 - 4 hours
- D. 5 - 6 hours

PND refers to acute episodes of severe shortness of breath and coughing that awaken the patient from sleep, usually 1 - 3 hours after the patient retires.

658 In bedridden HF patients, edema may be found in ?

Harrison's 18th Ed. 1905

- A. Interscapular region
- B. Scrotum
- C. Nape of the neck
- D. All of the above

In bedridden HF patients, edema may be found in sacral area (presacral edema) and scrotum.

659 Which of the following statements is false ?

Harrison's 18th Ed. 1906

- A. A normal ECG excludes LV systolic dysfunction
- B. Majority of patients with chronic HF do not have evidence of pulmonary hypertension, interstitial edema, and/or pulmonary edema
- C. Magnetic resonance imaging (MRI) is the gold standard for assessing LV mass & volumes
- D. None of the above

Majority of patients with chronic HF do not have evidence of pulmonary hypertension, interstitial edema, and/or pulmonary edema due to increased capacity of the lymphatics to remove interstitial and/or pulmonary fluid.

660 Which of the following is useful in HF patients with a preserved EF ?

Harrison's 18th Ed. 1906

- A. B-type natriuretic peptide (BNP)
- B. N-terminal pro-BNP
- C. Left atrial dilation by 2D Echo
- D. All of the above

By 2-D echocardiogram/Doppler, presence of left atrial dilation and LV hypertrophy, together

with abnormalities of LV diastolic filling is useful for the assessment of HF with a preserved EF. B-type natriuretic peptide (BNP) and N-terminal pro-BNP are elevated in HF patients with a preserved EF, although to a lesser degree.

661 Natriuretic peptide levels are more in ?

Harrison's 18th Ed. 1906

- A. Aged
- B. Renal impairment
- C. Women
- D. All of the above

Natriuretic peptide levels increase with age & renal impairment, are more elevated in women, and can be elevated in right HF from any cause.

662 Levels of which of the following may be elevated in HF ?

Harrison's 18th Ed. 1906

- A. C-reactive protein
- B. TNF receptors
- C. Uric acid
- D. All of the above

Levels of troponin T and I, C-reactive protein, TNF receptors, and uric acid, may be elevated in HF and provide important prognostic information.

663 Loop diuretics increase fractional excretion of sodium by ?

Harrison's 18th Ed. 1907

- A. 5 - 10 %
- B. 10 - 20 %
- C. 20 - 25 %
- D. 25 - 50 %

Loop diuretics increase the fractional excretion of sodium by 20 - 25 %. Thiazide diuretics increase it by 5 - 10 %.

664 Which of the following diuretics lead to hyperkalemia ?

Harrison's 18th Ed. 1907

- A. Spironolactone
- B. Eplerenone
- C. Triamterene
- D. All of the above

665 Which of the following can attenuate the effects of ACE inhibitors ?

Harrison's 18th Ed. 1908

- A. Anxiety
- B. Physical exercise
- C. Fluid retention
- D. All of the above

Fluid retention can attenuate the effects of ACE inhibitors. It is preferable to optimize the dose of diuretic before starting the ACE inhibitor.

666 Nonproductive cough as a side effect of ACE inhibitors is related to ?

Harrison's 18th Ed. 1909

- A. Stimulating guanylyl cyclase
- B. Interference with adrenergic nervous system
- C. Kinin potentiation
- D. All of the above

The side effects of ACE inhibitors related to kinin potentiation include a nonproductive cough (10 - 15%) and angioedema (1%).

667 Which of the following statements about beta blockers in HF is false ?

Harrison's 18th Ed. 1909

- A. Should be initiated in low doses
- B. Upward titration at 2-week intervals
- C. Maximum dose as reported effective in clinical trials
- D. None of the above

668 Aldosterone antagonists are not recommended when ?

Harrison's 18th Ed. 1910

- A. Serum creatinine is > 2.5 mg/dL
- B. Creatinine clearance is < 30 mL/minute
- C. Serum potassium is > 5 mmol/L
- D. Any of the above

669 Amiodarone increases the level of which of the following ?

Harrison's 18th Ed. 1911

- A. Phenytoin
- B. Digoxin
- C. Warfarin
- D. All of the above

670 Which of the following is an adverse effect of amiodarone ?

Harrison's 18th Ed. 1911

- A. Hyperthyroidism
- B. Hypothyroidism
- C. Hepatitis
- D. All of the above

Adverse effects of amiodarone include hyperthyroidism, hypothyroidism, pulmonary fibrosis and hepatitis.

671 Which of the following is a precipitating cause of acute decompensated HF (ADHF) ?

Harrison's 18th Ed. 1911

- A. Infection
- B. Pulmonary embolism
- C. Occult myocardial ischemia
- D. All of the above

Precipitating causes of acute decompensated HF (ADHF) include infection, arrhythmias, dietary indiscretion, pulmonary embolism, infective endocarditis, occult myocardial ischemia/infarction, and environmental and/or emotional stress.

672 Most patients with acute pulmonary edema belong to which of the following profiles ?

Harrison's 18th Ed. 1912

- A. Profile A
- B. Profile B
- C. Profile C
- D. Profile L

Patients with acute HF present with one of four basic hemodynamic profiles. Profile A - normal LV filling pressure with normal perfusion, Profile B - elevated LV filling pressure with normal perfusion, Profile C - elevated LV filling pressures with decreased perfusion and Profile L - normal or low LV filling pressure with decreased tissue perfusion. Profile B includes most patients with acute pulmonary edema.

673 Which of the following drugs exerts dilating effect on arterial resistance and venous capacitance vessels ?

Harrison's 18th Ed. 1912

- A. Nitroglycerin

- B. Nitroprusside
- C. Nesiritide
- D. All of the above

By stimulating guanylyl cyclase within smooth-muscle cells, nitroglycerin, nitroprusside, and nesiritide exert dilating effects on arterial resistance and venous capacitance vessels.

674 Cyanide toxicity in nitroprusside therapy occurs at doses ?

Harrison's 18th Ed. 1913

- A. > 150 µg / minute for over 24 hours
- B. > 150 µg / minute for over 48 hours
- C. > 250 µg / minute for over 24 hours
- D. > 250 µg / minute for over 48 hours

Cyanide toxicity (gastrointestinal & central nervous system) in nitroprusside therapy occurs at doses > 250 µg / minute for over 48 hours.

675 Nesiritide is best related to ?

Harrison's 18th Ed. 1913

- A. Atrial-type natriuretic peptide
- B. Brain-type natriuretic peptide
- C. Phosphodiesterase III inhibitor
- D. Endogenous catecholamine

Nesiritide is a recombinant form of brain-type natriuretic peptide, which is an endogenous peptide secreted primarily from LV in response to an increase in wall stress.

676 Which of the following is an inotropic agent ?

Harrison's 18th Ed. 1913

- A. Dopamine
- B. Dobutamine
- C. Tolvaptan
- D. All of the above

Dobutamine is an inotropic agent for the treatment of acute HF. It exerts its effects by stimulating β_1 and β_2 receptors, with little effect on α_1 receptors.

677 Which of the following is a phosphodiesterase III inhibitor ?

Harrison's 18th Ed. 1913

- A. Dopamine
- B. Dobutamine
- C. Tolvaptan
- D. Milrinone

Milrinone is a phosphodiesterase III inhibitor that leads to increased cyclic AMP by inhibiting its breakdown.

678 Dopamine stimulates which of the following ?

Harrison's 18th Ed. 1913

- A. α_1 receptors
- B. β_1 receptors
- C. Dopaminergic receptors
- D. All of the above

Dopamine is an endogenous catecholamine that stimulates α_1 and β_1 receptors and dopaminergic receptors (DA_1 and DA_2) in the heart and circulation.

679 Which of the following is administered orally ?

Harrison's 18th Ed. 1913

- A. Nesiritide
- B. Nitroprusside
- C. Tolvaptan
- D. Milrinone

680 Decompensation of chronic cor pulmonale is aggravated by ?

Harrison's 18th Ed. 1914

- A. Obesity hypoventilation syndrome (OHS)
- B. Acute pulmonary emboli
- C. Positive-pressure (mechanical) ventilation
- D. All of the above

Decompensation of chronic cor pulmonale can be aggravated by events that induce pulmonary vasoconstriction and RV afterload.

681 Most common cause of right-heart failure is ?

Harrison's 18th Ed. 1914

- A. Pulmonary parenchymal disease
- B. Pulmonary vascular disease
- C. Left heart failure
- D. Any of the above

Most common cause of right-heart failure is not pulmonary parenchymal or vascular disease but left heart failure.

Myocardial function

682 The blood pressure (BP) is the product of cardiac output (CO) and ?

Harrison's 18th Ed. 2218, Table 270-2

- A. Heart rate (HR)
- B. Peripheral vascular resistance (PVR)
- C. Stroke volume
- D. None of the above

683 Cardiac index (CI) is calculated by formula ?

Harrison's 18th Ed. 2218, Table 270-2

- A. Cardiac output / Body surface area
- B. Cardiac output / Body mass index
- C. Cardiac output / Heart rate
- D. Cardiac output / Peripheral vascular resistance

684 Stroke volume (SV) is calculated by the formula ?

Harrison's 18th Ed. 2218, Table 270-2

- A. Cardiac output / Heart rate
- B. Cardiac output / Body mass index
- C. Cardiac output / Body surface area
- D. Cardiac output / Peripheral vascular resistance

685 Systemic vascular resistance (SVR) is calculated by the formula ?

Harrison's 18th Ed. 2218, Table 270-2

- A. $[(MAP + RAP) \div CO] \times 80$
- B. $[(MAP \times RAP) \div CO] \times 80$
- C. $[(MAP - RAP) \times CO] \times 80$
- D. $[(MAP - RAP) \div CO] \times 80$

686 Pulmonary vascular resistance (PVR) is calculated by the formula ?

Harrison's 18th Ed. 2218, Table 270-2

- A. $[(PAPm - PCWP) \div CO] + 80$

- B. $[(\text{PAP}_m - \text{PCWP}) \div \text{CO}] - 80$
- C. $[(\text{PAP}_m - \text{PCWP}) \div \text{CO}] \times 80$
- D. $[(\text{PAP}_m - \text{PCWP}) \div \text{CO}] \div 80$

$$[(\text{PAP}_m - \text{PCWP})/\text{CO}] \times 80$$

687 In hypovolemic shock, which of the following is increased ?

Harrison's 18th Ed. 2219, Table 270-4

- A. CVP and PCWP
- B. Cardiac Output
- C. Systemic Vascular Resistance
- D. Venous O₂ Saturation

688 In cardiogenic shock, which of the following is decreased ?

Harrison's 18th Ed. 2219, Table 270-4

- A. CVP and PCWP
- B. Systemic Vascular Resistance
- C. Venous O₂ Saturation
- D. All of the above

689 In neurogenic shock, which of the following is increased ?

Harrison's 18th Ed. 2219, Table 270-4

- A. CVP and PCWP
- B. Systemic Vascular Resistance
- C. Venous O₂ Saturation
- D. None of the above

690 β_3 receptors are found predominantly in ?

Harrison's 16th Ed. 423

- A. Bronchi
- B. Adipose tissue
- C. Vasculature
- D. Heart

691 The credit of developing β blockers goes to ?

- A. Lionel H Opie
- B. James Black
- C. M Packer
- D. G Bardy

692 Which of the following is a lipid soluble β blocker ?

- A. Propranolol
- B. Atenolol
- C. Nadolol
- D. Sotalol

693 Which of the following β blockers has low hepatic clearance ?

- A. Propranolol
- B. Carvedilol
- C. Metoprolol
- D. Atenolol

694 Which of the following is true for Carvedilol ?

- A. Non selective β blocker
- B. Anti-oxidant

- C. α mediated vasodilator
- D. All of the above

695 Which of the following is a T-type calcium channel blocker ?

- A. Mibefradil
- B. Isradipine
- C. Nicardipine
- D. Nisoldipine

696 Which of the following is a dihydropyridine class of calcium-channel blocker ?

N Engl J Med 2006;355:608

- A. Amlodipine
- B. Nifedipine
- C. Nimodipine
- D. All of the above

697 Which of the following is the benzothiazepine class of calcium-channel blocker ?

N Engl J Med 2006;355:608

- A. Amlodipine
- B. Nifedipine
- C. Nimodipine
- D. Diltiazem

698 Which of the following is the phenylalkylamine class of calcium-channel blocker ?

N Engl J Med 2006;355:608

- A. Amlodipine
- B. Nifedipine
- C. Verapamil
- D. Diltiazem

699 Calcium-channel antagonists block which voltage gated calcium channel ?

N Engl J Med 2006;355:608

- A. K-type
- B. L-type
- C. M-type
- D. N-type

700 Amlodipine binds which subunit of voltage gated L-type calcium channels ?

N Engl J Med 2006;355:608

- A. α_{1a}
- B. α_{1b}
- C. α_{1c}
- D. α_{1d}

701 L-type calcium channels are found abundantly in all of the following tissues except ?

N Engl J Med 2006;355:608

- A. Cardiac myocytes
- B. Vascular smooth muscle
- C. Pancreatic beta cells
- D. Brain

- 702 The extracellular concentration of calcium is how many times more than the intracellular concentration ?**
N Engl J Med 2006;355:608
 A. 2000 times
 B. 5000 times
 C. 10000 times
 D. 20000 times
- 703 Stretching capability of which myofibrillar protein contributes to the elasticity of heart ?**
Harrison's 18th Ed. 1803
 A. Titin
 B. Myosin
 C. Actin
 D. All of the above
- 704 During activation of the myocyte, Ca^{2+} becomes attached to ?**
Harrison's 18th Ed. 1803
 A. Troponin C
 B. Troponin I
 C. Troponin T
 D. All of the above
- 705 Acceleration of cardiac relaxation occurs by phosphorylation by cyclic AMP of which protein ?**
Harrison's 18th Ed. 1803
 A. Troponin C
 B. Troponin I
 C. Troponin T
 D. All of the above
- 706 The sarcomere length associated with the most forceful contraction is approximately ?**
Harrison's 18th Ed. 1805
 A. 1.5 μm
 B. 2.2 μm
 C. 2.7 μm
 D. 3.2 μm
- 707 In Starling's law of heart, the force of ventricular contraction is a function of ?**
Harrison's 18th Ed. 1805
 A. End-diastolic length of cardiac muscle
 B. End-systolic length of cardiac muscle
 C. Mid-diastolic length of cardiac muscle
 D. Mid-systolic length of cardiac muscle
- 708 During exercise, which of the following parameters show relatively little change ?**
Harrison's 18th Ed. 1806
 A. LV end-diastolic pressure
 B. Cardiac output
 C. Aortic flow velocity
 D. Rate of ventricular pressure development
- 709 Drugs that enhance relaxation of myocardium are called ?**
Harrison's 16th Ed. 1362
 A. Dromotropic
 B. Ionotropic
 C. Lusitropic
 D. Cathotropic
- 710 Which protein series mediates the activation of adenylate cyclase by β -adrenergic agonists ?**
Harrison's 16th Ed. 1362
 A. E
 B. F
 C. G
 D. H
- 711 Ejection fraction is the ?**
Harrison's 18th Ed. 1906
 A. Ratio of stroke volume to end-systolic volume
 B. Ratio of stroke volume to end-diastolic volume
 C. Ratio of end-systolic volume to stroke volume
 D. Ratio of end-diastolic volume to stroke volume
- 712 Normal value of ventricular end-diastolic volume is ?**
Harrison's 16th Ed. 1362
 A. $50 \pm 20 \text{ mL/m}^2$
 B. $60 \pm 20 \text{ mL/m}^2$
 C. $70 \pm 20 \text{ mL/m}^2$
 D. $80 \pm 20 \text{ mL/m}^2$
- 713 Cardiac function variable that is influenced by ventricular loading conditions is ?**
Harrison's 16th Ed. 1362
 A. Cardiac output
 B. Ejection fraction
 C. Ventricular volumes
 D. All of the above
- 714 Atrial contribution to ventricular filling is reduced by ?**
Harrison's 16th Ed. 1363
 A. Atrial fibrillation
 B. Atrioventricular dissociation
 C. Prolongation or abbreviation of P-R interval
 D. All of the above
- 715 Afterload is determined by ?**
Harrison's 18th Ed. 1805
 A. Arterial pressure
 B. LV volume
 C. Thickness of LV wall
 D. All of the above
- 716 Which of the following parameter is included in Laplace's law ?**
Harrison's 18th Ed. 1805
 A. Intracavitary ventricular pressure
 B. Ventricular radius
 C. Wall thickness
 D. All of the above

717 Laplace's law indicates ?

Harrison's 18th Ed. 1805

- A. Length of myocardial fiber
- B. Tension of myocardial fiber
- C. Diameter of myocardial fiber
- D. All of the above

718 Which of the following is not a loop diuretic ?

Harrison's 18th Ed. 1907

- A. Metolazone
- B. Piretanide
- C. Bumetanide
- D. Torsemide

719 Which of these loop diuretics is associated with deafness ?

Harrison's 15th Ed. 428

- A. Furosemide
- B. Bumetanide
- C. Ethacrynic acid
- D. Torsemide

720 Diastolic heart failure is differentiated from systolic heart failure by ?

N Engl J Med 2004;351:1097-105

- A. Ejection fraction
- B. Relative wall thickness
- C. End diastolic volume
- D. All of the above

721 Ventricular "remodelling" is a result of ?

Lancet 2005; 365: 1877-89

- A. Loss of myocytes
- B. Maladaptive changes in surviving myocytes
- C. Maladaptive changes in extracellular matrix
- D. All of the above

722 Plasma concentrations of all of the following substances are markedly increased in septic shock except ?

N Engl J Med 2001;345:588

- A. Atrial natriuretic peptide
- B. Calcitonin gene-related peptide
- C. Adenosine
- D. Vasopressin

723 Vasoconstrictor effects of vasopressin occur at plasma vasopressin concentrations in the range of ?

N Engl J Med 2001;345:588

- A. 1 to 7 pg per milliliter
- B. 10 to 200 pg per milliliter
- C. 200 to 400 pg per milliliter
- D. 600 to 800 pg per milliliter

724 In vasodilatory shock, resistance is observed to all of the following except ?

N Engl J Med 2001;345:588

- A. Norepinephrine

B. Angiotensin II

C. Endothelin

D. Vasopressin

725 Mechanism of vasodilatory shock include ?

N Engl J Med 2001;345:588

- A. Increased nitric oxide synthesis & depletion of vasopressin
- B. Activation of ATP-sensitive potassium channels
- C. Activation of calcium-regulated potassium channels
- D. All of the above

726 Brain natriuretic peptide (BNP) is formed from ?

Harrison's 16th Ed. 1371

- A. Pre pro-BNP
- B. Pro-BNP
- C. N-terminal-pro-BNP
- D. N-terminal BNP

727 Brain natriuretic peptide (BNP) is secreted predominantly by ?

N Engl J Med 2005;353:2788-96

- A. Cardiac ventricle
- B. Cerebral cortex
- C. Cerebellum
- D. All of the above

728 Brain natriuretic peptide (BNP) is secreted by cardiac ventricles in response to ?

N Engl J Med 2005;353:2788-96

- A. Wall stretch
- B. Decreased intracardiac pressures
- C. Hypotension
- D. Bradycardia

729 What level of BNP indicates that heart failure is likely ?

N Engl J Med 2005;353:2788-96

- A. > 500 pg per milliliter
- B. > 1000 pg per milliliter
- C. > 1500 pg per milliliter
- D. > 2000 pg per milliliter

730 Which of the following is a brain natriuretic peptide (BNP) ?

Harrison's 18th Ed. 1913

- A. Adenosine
- B. Omapatrilat
- C. Nesiritide
- D. Fenoldopam

731 Which of the following is a dopamine receptor stimulator ?

Harrison's 16th Ed. 1478

- A. Adenosine
- B. Omapatrilat
- C. Nesiritide
- D. Fenoldopam

Fenoldopam is a dopamine a-1 specific agonist approved as a parenteral antihypertensive agent.

- 732 Pulmonary edema may not be visible on chest X-ray until the amount of lung water increases by ?**

N Engl J Med 2005;353:2788-96

- A. 10 percent
- B. 20 percent
- C. 30 percent
- D. 40 percent

- 733 Following are the radiographic features of cardiogenic pulmonary oedema except ?**

N Engl J Med 2005;353:2788-96

- A. Greater than normal heart size
- B. Increased width of vascular pedicle
- C. Septal lines (Kerley's B lines)
- D. Absent peribronchial cuffing

Chapter 236. Congenital Heart Disease in the Adult

- 734 The most common birth defects have origin in ?**

Harrison's 18th Ed. 1920

- A. Cardiovascular system
- B. Central nervous system
- C. Gastrointestinal system
- D. Urogenital system

The most common birth defects are cardiovascular in origin.

- 735 Congenital heart disease complicates what percentage of all live births ?**

Harrison's 18th Ed. 1920

- A. ~ 1 %
- B. ~ 2 %
- C. ~ 3 %
- D. ~ 4 %

CHD complicates ~1% of all live births in general population, but occurs in 4% of offspring of women with CHD.

- 736 Which of the following arches develop as the internal carotid arteries ?**

Harrison's 18th Ed. 1920

- A. 1
- B. 2
- C. 3
- D. 4

Truncus arteriosus & aortic sac initially develop six paired symmetric arches. Development of arch 3 results in internal carotid arteries, left arch 4 as the aortic arch and right subclavian artery, and part of arch 6 as the patent ductus arteriosus.

- 737 Sinus venosus receives which of the following veins ?**

Harrison's 18th Ed. 1920

- A. Umbilical vein
- B. Vitelline vein
- C. Common cardinal vein
- D. All of the above

Sinus venosus receives the umbilical, vitelline, and common cardinal veins.

- 738 Which of the following congenital heart disease is more common in females ?**

Harrison's 18th Ed. 1921

- A. ASD
- B. Congenital valvular AS
- C. Coarctation of aorta
- D. Complete transposition of great vessels

ASD occurs more frequently in females. Congenital valvular AS, Coarctation of aorta and Complete transposition of great vessels is more frequent in males.

- 739 Which of the following ASD type is associated with anomalous pulmonary venous connection ?**

Harrison's 18th Ed. 1921

- A. Sinus venosus ASD
- B. Ostium primum ASD
- C. Ostium secundum ASD
- D. Patent foramen ovale

ASD in sinus venosus type is high up in the atrial septum near the entry of superior vena cava into right atrium. It is associated frequently with anomalous pulmonary venous connection from the right lung to the superior vena cava or right atrium.

- 740 ASD occurs in the basal portion of the interventricular septum in which of the following ?**

Harrison's 18th Ed. 1921

- A. Sinus venosus ASD
- B. Ostium primum ASD
- C. Ostium secundum ASD
- D. Patent foramen ovale

- 741 Which of the following ASD is more common in Down syndrome ?**

Harrison's 18th Ed. 1921

- A. Sinus venosus ASD
- B. Ostium primum ASD
- C. Ostium secundum ASD
- D. Patent foramen ovale

- 742 Which out of the following ASD is most common ?**

Harrison's 18th Ed. 1921

- A. Sinus venosus ASD
- B. Ostium primum ASD
- C. Ostium secundum ASD
- D. Patent foramen ovale

- 743 Which out of the following ASD involves the fossa ovalis ?**

Harrison's 18th Ed. 1921

- A. Sinus venosus ASD
- B. Ostium primum ASD
- C. Ostium secundum ASD
- D. Patent foramen ovale

- 744 Mid-diastolic rumbling murmur in ASD is loudest at ?**

Harrison's 18th Ed. 1922

- A. 3rd intercostal space, along left sternal border
- B. 3rd intercostal space, along right sternal border
- C. 4th intercostal space, along left sternal border
- D. 4th intercostal space, along right sternal border

745 Which of the following cardiac murmurs can be heard in various types of compensated ASD ?

Harrison's 18th Ed. 1922

- A. Midsystolic pulmonary outflow murmur
- B. Mid-diastolic left parasternal murmur
- C. Apical holosystolic murmur
- D. All of the above

Increased flow across the pulmonic valve is responsible for a midsystolic pulmonary outflow murmur. Mid-diastolic murmur at fourth intercostal space and along left sternal border indicates increased flow across tricuspid valve. In ostium primum ASD, apical holosystolic murmur indicates associated mitral or tricuspid regurgitation or a ventricular septal defect (VSD).

746 In ASD, second heart sound is widely split and is relatively fixed in relation to ?

Harrison's 18th Ed. 1922

- A. Respiration
- B. Posture
- C. Heart rate
- D. All of the above

In ASD, second heart sound is widely split and is relatively fixed in relation to respiration.

747 In adults with an ASD and atrial fibrillation, the physical findings may be confused with ?

Harrison's 18th Ed. 1922

- A. Mitral stenosis
- B. Tricuspid stenosis
- C. Pulmonary stenosis
- D. Mitral regurgitation

In adults with an ASD and atrial fibrillation, physical findings may be confused with mitral stenosis with pulmonary hypertension because the tricuspid diastolic flow murmur and widely split second heart sound may be mistakenly thought to represent the diastolic murmur of mitral stenosis and the mitral "opening snap," respectively.

748 Which of the following statements about ostium secundum type of ASD is false ?

Harrison's 18th Ed. 1922

- A. ECG shows left axis deviation
- B. S₂ widely split and relatively fixed
- C. Middiastolic rumbling murmur
- D. Midsystolic pulmonary ejection murmur

In ostium secundum ASD, ECG shows right-axis deviation and an rSr' pattern in right precordial leads representing enlargement of the RV outflow tract.

749 In ECG of cases of ostium primum ASD, which of the following is true ?

Harrison's 18th Ed. 1922

- A. Right-axis deviation
- B. Left superior axis deviation
- C. Left inferior axis deviation
- D. Left-axis deviation

750 In ECG of cases of ostium primum ASD, which of the following is true ?

Harrison's 18th Ed. 1922

- A. Clockwise rotation of frontal plane QRS loop
- B. Counterclockwise rotation of frontal plane QRS loop
- C. Clockwise rotation of sagittal plane QRS loop
- D. Counterclockwise rotation of sagittal plane QRS loop

In ostium primum ASD, the RV conduction defect is accompanied by left superior axis deviation and counterclockwise rotation of the frontal plane QRS loop.

751 Which of them is a finding in echocardiogram of a patient of ASD ?

Harrison's 18th Ed. 1922

- A. Pulmonary arterial dilatation
- B. RV and RA dilatation
- C. Abnormal (paradoxical) ventricular septal motion
- D. All of the above

In ASD, echocardiography reveals pulmonary arterial and RV and RA dilatation with abnormal (paradoxical) ventricular septal motion in the presence of a significant right heart volume overload. ASD may be visualized directly by two-dimensional imaging, color-flow imaging, or echocontrast.

752 Which of the following about atrial septal defect is false ?

Harrison's 18th Ed. 1922

- A. Sinus venosus ASD cases rarely die before 5th decade
- B. Ostium secundum ASD cases rarely die before 5th decade
- C. Risk of infective endocarditis in ASD is low
- D. None of the above

Closure by an appropriate method should be advised in uncomplicated secundum ASD with significant left-to-right shunting, i.e., pulmonary-to-systemic flow ratios 2:1. Patients with sinus venosus or ostium secundum ASDs rarely die before the fifth decade. Risk of infective endocarditis is quite low unless ASD is complicated by valvular regurgitation or has recently been repaired with a patch or device.

753 In Eisenmenger's syndrome, a large communication between systemic and pulmonary circulation exists at ?

Harrison's 18th Ed. 1923

- A. Aortopulmonary level
- B. Ventricular level
- C. Atrial level
- D. Any of the above

Eisenmenger's syndrome refers to a large communication between systemic and pulmonary circulations at the aortopulmonary, ventricular, or atrial levels. Flow is bidirectional or predominantly right-to-left because of high resistance and obstructive pulmonary hypertension.

754 In Eisenmenger syndrome, symptoms in adult life consist of ?

Harrison's 18th Ed. 1923

- A. Chest pain
- B. Syncope
- C. Hemoptysis
- D. All of the above

In patients with Eisenmenger syndrome, symptoms in adult life consist of exertional dyspnea, chest pain, syncope, and hemoptysis.

755 In patients with Eisenmenger syndrome, right-to-left shunt leads to ?

Harrison's 18th Ed. 1923

- A. Cyanosis
- B. Clubbing
- C. Erythrocytosis
- D. All of the above

In patients with Eisenmenger syndrome, right-to-left shunt leads to cyanosis, clubbing, and erythrocytosis.

756 Pulmonary vascular disease does not progress after operative correction of shunt, if pulmonary vascular resistance is less than systemic vascular resistance by ?

Harrison's 18th Ed. 1923

- A. One-third
- B. One-half
- C. Two-third
- D. Three-fourth

The degree to which pulmonary vascular resistance is elevated before operation is a critical factor determining prognosis. If the pulmonary vascular resistance is one-third or less of the systemic value, progression of pulmonary vascular disease after operation is unusual.

757 Which of the following is a consequence of chronic hypoxemia in cyanotic CHD ?

Harrison's 18th Ed. 1923

- A. Secondary erythrocytosis
- B. Abnormal hemostasis
- C. Hyperviscosity
- D. All of the above

758 Which of the following about Ductus Arteriosus is false ?

Harrison's 18th Ed. 1924

- A. Originates from bifurcation of pulmonary artery
- B. Ends at aorta just distal to left subclavian artery
- C. Continuous murmur best heard at upper left sternal edge
- D. None of the above

759 Differential cyanosis is best related to ?

Harrison's 18th Ed. 1924

- A. ASD
- B. VSD
- C. Patent ductus arteriosus
- D. Tetralogy of Fallot

In PDA, severe pulmonary vascular disease results in reversal of flow through ductus thereby unoxygenated blood is shunted to descending aorta leading to cyanosis and clubbing of the toes, but not fingers. This is called differential cyanosis.

760 Leading cause of death in adults with PDA is ?

Harrison's 18th Ed. 1924

- A. Infective endocarditis
- B. Cardiac arrhythmia
- C. Brain abscess
- D. Restrictive lung disease

Leading causes of death in adults with patent ductus are cardiac failure & infective endocarditis.

761 Which of the following is aortic root - to - right-heart shunt ?

Harrison's 18th Ed. 1924

- A. Congenital aneurysm of aortic sinus of Valsalva with fistula
- B. Coronary arteriovenous fistula
- C. Anomalous origin of LCA from pulmonary trunk
- D. All of the above

The three most common causes of aortic root-to-right-heart shunts are congenital aneurysm of an aortic sinus of Valsalva with fistula, coronary arteriovenous fistula, and anomalous origin of the left coronary artery (LCA) from the pulmonary trunk.

762 In aneurysm of an aortic sinus of Valsalva, when the noncoronary cusp is ruptured, the fistula drains into ?

Harrison's 18th Ed. 1924

- A. Right atrium
- B. Right ventricle

- C. Left atrium
- D. Left ventricle

Rupture of aneurysm of an aortic sinus of Valsalva leads to aorticocardiic fistula mostly between right coronary cusp and the right ventricle. When the noncoronary cusp is involved, the fistula drains into the right atrium.

763 Cause of continuous murmur that accentuates in diastole is ?

Harrison's 18th Ed. 1924

- A. Rupture of aneurysm of an aortic sinus of Valsalva
- B. VSD
- C. Patent ductus arteriosus
- D. Tetralogy of Fallot

Abrupt rupture causes chest pain, bounding pulses, a continuous murmur accentuated in diastole, and volume overload of the heart.

764 In coronary arteriovenous fistula, there occurs communication between a coronary artery and ?

Harrison's 18th Ed. 1924

- A. Coronary sinus
- B. Right atrium
- C. Right ventricle
- D. Any of the above

Coronary arteriovenous fistula consists of a communication between a coronary artery and another cardiac chamber, usually coronary sinus, right atrium, or right ventricle.

765 Which of the following is true for the murmur due to coronary arteriovenous fistula ?

Harrison's 18th Ed. 1924

- A. Loud and superficial
- B. Continuous
- C. Best heard at lower or midsternal border
- D. All of the above

766 Coronary "steal" syndrome best relates to ?

Harrison's 18th Ed. 1924

- A. Congenital aneurysm of aortic sinus of Valsalva with fistula
- B. Coronary arteriovenous fistula
- C. Anomalous origin of left coronary artery from pulmonary trunk
- D. All of the above

In coronary arteriovenous fistula, shunt is usually of small magnitude and myocardial blood flow is not usually compromised. But if the shunt is large, there may be a coronary "steal" syndrome with myocardial ischemia and possible angina or ventricular arrhythmias.

767 In which of the following condition, coronary arteries are subjected to elevated systolic pressures from left ventricle ?

Harrison's 18th Ed. 1925

- A. Congenital Aortic Stenosis
- B. Subaortic Stenosis
- C. Supravalvular Aortic Stenosis
- D. All of the above

Coronary arteries are subjected to elevated systolic pressures from the left ventricle in supravalvular aortic stenosis.

768 Which of the following is not a feature of Williams-Beuren syndrome ?

Harrison's 18th Ed. 1925

- A. "Elfin" facies

- B. Mental retardation with retained language skills
- C. Supravalvular aortic stenosis
- D. Transient hyperkalemia

Supravalvular aortic stenosis is associated cardiac defect in Williams-Beuren syndrome, typically comprising of "elfin" facies, low nasal bridge, cheerful demeanor, mental retardation with retained language skills and love of music, and transient hypercalcemia.

769 Coarctation of the aorta occurs in what percentage of patients with congenital heart disease ?

Harrison's 18th Ed. 1925

- A. 2 %
- B. 3 %
- C. 5 %
- D. 7 %

Narrowing or constriction of the lumen of the aorta may occur anywhere along its length but is most common distal to the origin of the left subclavian artery near the insertion of the ligamentum arteriosum. Coarctation of the aorta occurs in 7% of patients with congenital heart disease and is more common in males than females.

770 Which of the following is more common in coarctation of the aorta ?

Harrison's 18th Ed. 1925

- A. Turner syndrome
- B. Bicuspid aortic valve
- C. Circle of Willis aneurysms
- D. All of the above

Coarctation of the aorta is frequent in patients with gonadal dysgenesis (Turner syndrome) and is associated with bicuspid aortic valve (75%) and Circle of Willis aneurysms.

771 In coarctation of the aorta, enlarged and pulsatile collateral vessels may be palpated in ?

Harrison's 18th Ed. 1925

- A. Intercostal spaces
- B. Axillae
- C. Interscapular area
- D. All of the above

In coarctation of the aorta, enlarged and pulsatile collateral vessels may be palpated in the intercostal spaces anteriorly, in the axillae, or posteriorly in the interscapular area.

772 In Chest x-ray, "3" sign relates to which of the following ?

Harrison's 18th Ed. 1925

- A. Patent ductus arteriosus
- B. Supravalvular Aortic Stenosis
- C. Coarctation of the aorta
- D. Tetralogy of Fallot

Chest x-ray in Coarctation of the aorta shows a dilated left subclavian artery high on the left mediastinal border and a dilated ascending aorta. Indentation of the aorta at the site of coarctation with pre- and poststenotic dilatation ("3" sign) along left paramediastinal shadow are pathognomonic.

773 In coarctation of the aorta, radiographic notching of which of the following ribs is seen ?

Harrison's 18th Ed. 1925

- A. 3rd to 5th ribs
- B. 3rd to 7th ribs
- C. 3rd to 9th ribs
- D. 3rd to 12th ribs

In coarctation of the aorta, notching of the third to ninth ribs is an important radiographic sign. This is due to inferior rib erosion by dilated collateral vessels.

774 Which of the following is the hazard of coarctation of aorta ?

Harrison's 18th Ed. 1925

- A. Cerebral aneurysms and hemorrhage
- B. Aortic dissection and rupture
- C. Premature coronary arteriosclerosis
- D. All of the above

In coarctation of the aorta, the chief hazards of proximal aortic severe hypertension include cerebral aneurysms and hemorrhage, aortic dissection and rupture, premature coronary arteriosclerosis, and LV failure.

775 In Tetralogy of Fallot, severity of which of the following determines the clinical presentation ?

Harrison's 18th Ed. 1926

- A. Size of VSD
- B. Aortic override of the VSD
- C. RV outflow obstruction
- D. RV hypertrophy

The four components of the tetralogy of Fallot are malaligned VSD, obstruction to RV outflow, aortic override of the VSD, and RV hypertrophy due to the RV's response to aortic pressure via the large VSD. The severity of RV outflow obstruction determines the clinical presentation.

776 Which of the following may also be present in TOF ?

Harrison's 18th Ed. 1926

- A. Pulmonary valve stenosis
- B. Unilateral absence of a pulmonary artery
- C. Right-sided aortic arch & descending thoracic aorta
- D. All of the above

In tetralogy of Fallot, severity of hypoplasia of the RV outflow tract varies from mild to complete (pulmonary atresia). Pulmonary valve stenosis and supravalvular and peripheral pulmonary arterial obstruction may coexist. Rarely, there is unilateral absence of a pulmonary artery (usually left). A right-sided aortic arch and descending thoracic aorta occur in 25%.

777 Which of the following about Chest x-ray findings in Tetralogy of Fallot is false ?

Harrison's 18th Ed. 1926

- A. Enlarged heart
- B. Boot-shaped heart (coeur en sabot)
- C. Oligemic lung fields
- D. Concavity in the region of pulmonary conus

In Tetralogy of Fallot, chest x-ray shows a normal-sized, boot-shaped heart (coeur en sabot) with a prominent right ventricle and a concavity in the region of pulmonary conus. Pulmonary vascular markings are typically diminished, and the aortic arch and knob may be on the right side.

778 Which of the following about treatment in TOF is false ?

Harrison's 18th Ed. 1927

- A. Reoperation in adults is mostly for severe PR
- B. Ventricular and atrial arrhythmias common
- C. Aortic regurgitation common
- D. Endocarditis risk eliminated after surgical repair

Most adults with tetralogy of Fallot have had some form of previous surgical intervention. Reoperation in adults is most commonly for severe pulmonary regurgitation. Ventricular & atrial arrhythmias require treatment. Aortic root has a medial tissue defect & it is commonly enlarged & associated with aortic regurgitation. Endocarditis remains a risk despite surgical repair.

779 Which is the most common communication in complete transposition of the great arteries ?

Harrison's 18th Ed. 1927

- A. ASD
- B. VSD

- C. PDA
- D. All of the above

Most patients of complete transposition of the great arteries have an interatrial communication, two-thirds have a patent ductus arteriosus, and about one-third have an associated VSD.

780 Most common finding in Ebstein's Anomaly is ?

Harrison's 18th Ed. 1927

- A. MS
- B. MR
- C. TS
- D. TR

Ebstein's Anomaly is characterized by a downward displacement of tricuspid valve into right ventricle, due to anomalous attachment of tricuspid leaflets, tissue of which is dysplastic. This results in tricuspid regurgitation.

781 During pregnancy, congenital cardiac malformations that are "well" tolerated (NYHA class I) include all except ?

Harrison's 16th Ed. 1383

- A. Aortic or mitral regurgitation (mild-moderate)
- B. Aortic or mitral stenosis (moderate)
- C. Pulmonary or tricuspid regurgitation
- D. Pulmonary stenosis (mild-moderate)

782 Heritable syndromes with associated ASD include all except ?

Harrison's 16th Ed. 1382

- A. TAR (thrombocytopenia-absent radius)
- B. Noonan
- C. Holt-Oram
- D. Ellis-van Creveld

783 Heritable syndromes with associated VSD include all except ?

Harrison's 16th Ed. 1382

- A. Holt-Oram
- B. Apert
- C. Shprintzen
- D. Conradi-Hunermann

784 Heritable syndromes with associated PDA include all except ?

Harrison's 16th Ed. 1382

- A. Conradi-Hunermann
- B. Incontinentia pigmenti
- C. Noonan
- D. Crouzon

785 Heritable syndromes with associated Tetralogy of Fallot include all except ?

Harrison's 16th Ed. 1382

- A. Catch-22 (DiGeorge)
- B. TAR (thrombocytopenia-absent radius)
- C. Multiple lentigines (LEOPARD) syndrome
- D. Shprintzen (velocardiofacial)

786 Heritable syndrome with associated supraaortic stenosis is ?

Harrison's 16th Ed. 1382

- A. Kartagener
- B. Laurence-Moon-Biedl-Bardet

- C. Williams
- D. Crouzon

787 Heritable syndromes with associated aortic regurgitation include ?

Harrison's 16th Ed. 1382

- A. Marquio
- B. Scheie
- C. Maroteaux-Lamy
- D. All of the above

788 Chromosomal abnormalities with associated VSD include ?

Harrison's 16th Ed. 1382

- A. Cri du chat
- B. Trisomy 13 (D)
- C. Trisomy 21 (Down syndrome)
- D. All of the above

789 Ebstein's anomaly occurs with which of the following teratogenic drugs ?

Harrison's 16th Ed. 1383

- A. Alcohol
- B. Lithium
- C. Dilantin
- D. Thalidomide

790 Which of the following heritable syndromes is associated with ASD ?

Harrison's 16th Ed. 1382

- A. Ellis-van Creveld syndrome
- B. TAR (Thrombocytopenia-absent radius) syndrome
- C. Holt-Oram syndrome
- D. All of the above

791 Which of the following heritable syndromes is associated with PDA ?

Harrison's 16th Ed. 1382

- A. Crouzon syndrome
- B. Incontinentia pigmenti
- C. Conradi-Hunermann syndrome
- D. All of the above

792 Which of the following connective tissue disorders is associated with peripheral coronary arterial disease ?

Harrison's 16th Ed. 1382

- A. Marfan's
- B. Osteogenesis imperfecta
- C. Pseudoxanthoma elasticum
- D. Ehlers-Danlos syndrome

793 Which of the following connective tissue disorders is associated with peripheral pulmonic stenosis ?

Harrison's 16th Ed. 1382

- A. Marfan's
- B. Osteogenesis imperfecta
- C. Pseudoxanthoma elasticum
- D. Cutis laxa

794 Which of the following chromosomal disorders is associated with Tetralogy of Fallot ?

Harrison's 16th Ed. 1382

- A. Turner syndrome
- B. Down syndrome
- C. Trisomy 8
- D. Cri du chat syndrome

795 Which of the following chromosomal disorders is associated with coarctation of aorta ?

Harrison's 16th Ed. 1382

- A. Turner syndrome
- B. Down syndrome
- C. Trisomy 18
- D. Cri du chat syndrome

796 Which of the following heritable syndromes is associated with Tetralogy of Fallot?

Harrison's 16th Ed. 1382

- A. Turner syndrome
- B. Catch-22 syndrome
- C. Shprintzen syndrome
- D. All of the above

797 Which of the following heritable syndromes is associated with supraaortic stenosis ?

Harrison's 16th Ed. 1382

- A. Turner syndrome
- B. Catch-22 syndrome
- C. Shprintzen syndrome
- D. Williams syndrome

798 Which congenital malformation is typical of rubella embryopathy ?

Harrison's 16th Ed. 1387

- A. Multiple sites of narrowing of peripheral pulmonary arteries
- B. Coarctation of aorta
- C. Tricuspid atresia
- D. VSD

Chapter 237. Valvular Heart Disease

799 Which of the following is not a cause of obstruction to left atrial outflow ?

Harrison's 18th Ed. 1929

- A. Systemic lupus erythematosus
- B. Rheumatoid arthritis
- C. Wegeners granulomatosis
- D. Cor triatriatum

Rheumatic fever is the leading cause of mitral stenosis (MS). Other less common etiologies of obstruction to left atrial outflow include congenital mitral valve stenosis, cor triatriatum, mitral annular calcification with extension onto the leaflets, systemic lupus erythematosus, rheumatoid arthritis, left atrial myxoma, and infective endocarditis with large vegetations.

800 What proportion of all patients with rheumatic heart disease & a history of rheumatic fever have pure or predominant MS ?

Harrison's 18th Ed. 1929

- A. 10 %
- B. 20 %
- C. 30 %
- D. 40 %

Pure or predominant MS occurs in ~40% of all patients with rheumatic heart disease and a history of rheumatic fever.

801 In patients of MS with atrial fibrillation (AF), thrombi arise more frequently from ?

Harrison's 18th Ed. 1929

- A. Mitral valve leaflets
- B. Chordae tendineae
- C. Left atrial appendage
- D. Mitral commissures

Thrombus formation & arterial embolization may arise from calcific valve itself, but in patients with atrial fibrillation (AF), thrombi arise more frequently from the dilated left atrium (LA), particularly from within the left atrial appendage.

802 In normal adults, which of the following parameter of the mitral valve orifice is 4-6 cm² ?

Harrison's 18th Ed. 1929

- A. Diameter
- B. Circumference
- C. Area
- D. Radius

In normal adults, the area of the mitral valve orifice is 4-6 cm².

803 Significant obstruction of mitral valve orifice is considered when the orifice is less than approximately ?

Harrison's 18th Ed. 1929

- A. 1 cm²
- B. 2 cm²
- C. 3 cm²
- D. 4 cm²

Mitral valve orifice area of < ~2 cm² is considered "significant obstruction" because blood can flow from LA to LV only if propelled by an abnormally elevated left atrioventricular pressure gradient.

804 Mitral stenosis is called "moderate", when the mitral valve orifice is ?

Harrison's 18th Ed. 1929

- A. 1.0 cm² - 1.5 cm²
- B. 1.5 cm² - 2.0 cm²
- C. 2.0 cm² - 2.5 cm²
- D. 2.5 cm² - 3.0 cm²

Mitral stenosis is called "moderate", when the mitral valve orifice is 1.0 cm² - 1.5 cm².

805 Mitral stenosis is called "severe", when the mitral valve opening is reduced to ?

Harrison's 18th Ed. 1929

- A. < 1.5 cm²
- B. < 1 cm²
- C. < 0.5 cm²
- D. < 0.2 cm²

When the mitral valve opening is reduced to < 1 cm² it is referred to as "severe" MS.

806 In severe MS, LA pressure required to maintain a normal cardiac output is ?

Harrison's 18th Ed. 1929

- A. ~ 10 mm Hg
- B. ~ 15 mm Hg
- C. ~ 20 mm Hg
- D. ~ 25 mm Hg

In severe MS, LA pressure of ~25 mmHg is required to maintain a normal cardiac output.

807 Pulmonary hypertension is considered severe if the pulmonary artery systolic pressure (PASP) is more than ?

Harrison's 18th Ed. 1932, Figure 237-1

- A. 20 mm Hg
- B. 40 mm Hg
- C. 60 mm Hg
- D. 80 mm Hg

808 Hemodynamic variable of importance in Mitral Stenosis is ?

Harrison's 18th Ed. 1929

- A. Transvalvular pressure gradient
- B. Cardiac output
- C. Heart rate
- D. All of the above

Hemodynamic severity of MS depends on transvalvular pressure gradient and the flow rate which depends on the cardiac output and heart rate.

809 Clinical and hemodynamic features of MS are influenced importantly by ?

Harrison's 18th Ed. 1929

- A. Cardiac output
- B. Heart rate
- C. Transvalvular pressure gradient
- D. Pulmonary arterial pressure (PAP)

The clinical and hemodynamic features of MS are influenced importantly by the level of the PAP.

810 "Second stenosis" refers to which of the following ?

Harrison's 18th Ed. 1929

- A. Passive backward transmission of elevated LA pressure
- B. Pulmonary arteriolar constriction
- C. Interstitial edema in walls of small pulmonary vessels
- D. Organic obliterative changes in pulmonary vascular bed

Pulmonary hypertension results from passive backward transmission of elevated LA pressure; pulmonary arteriolar constriction ("second stenosis"), interstitial edema in walls of small pulmonary vessels and organic obliterative changes in pulmonary vascular bed.

811 Severe pulmonary hypertension results in ?

Harrison's 18th Ed. 1929

- A. RV enlargement
- B. Secondary tricuspid regurgitation (TR)
- C. Pulmonic regurgitation (PR)
- D. All of the above

Severe pulmonary hypertension results in RV enlargement, secondary tricuspid regurgitation (TR) and pulmonic regurgitation (PR), as well as right-sided heart failure.

812 What proportion of all patients with mitral stenosis are female ?

Harrison's 16th Ed. 1390

- A. One-fourth

- B. One-third
- C. Two-third
- D. Three-fourth

813 Which of the following about mitral stenosis is false ?

Harrison's 18th Ed. 1929

- A. Latent period between initial attack of rheumatic carditis & development of symptoms due to MS is ~ 2 decades
- B. Infective endocarditis is rare in isolated MS
- C. Hemoptysis is rarely fatal
- D. None of the above

814 In MS, hemoptysis results from rupture of ?

Harrison's 18th Ed. 1930

- A. Alveolar capillaries
- B. Pulmonary arterioles
- C. Bronchial arterioles
- D. Pulmonary-bronchial venous connections

Hemoptysis results from rupture of pulmonary-bronchial venous connections secondary to pulmonary venous hypertension in patients who have elevated LA pressures without markedly elevated pulmonary vascular resistances and is rarely fatal.

815 In MS, hemoptysis results from ?

Harrison's 18th Ed. 1930

- A. Pulmonary-bronchial venous connections
- B. Recurrent pulmonary emboli
- C. Pulmonary infections
- D. All of the above

816 Which of the following PFT variable is reduced in MS ?

Harrison's 18th Ed. 1930

- A. Vital capacity
- B. Total lung capacity
- C. Maximal breathing capacity
- D. All of the above

In addition to interstitial edema in walls of small pulmonary vessels and organic obliterative changes in pulmonary vascular bed, fibrous thickening of walls of alveoli & pulmonary capillaries occurs commonly in MS. Vital capacity, total lung capacity, maximal breathing capacity, and oxygen uptake per unit of ventilation are reduced.

817 In MS, systemic embolization occurs more frequently in ?

Harrison's 18th Ed. 1930

- A. Patients with AF
- B. In older patients
- C. In those with a reduced CO
- D. All of the above

Thrombi form in left atria, particularly in enlarged atrial appendages of patients with MS. Systemic embolization, incidence of which is 10–20%, occurs more frequently in patients with AF, in older patients (>65 years), and in those with a reduced CO.

818 Which of the following is false in auscultation in MS ?

Harrison's 18th Ed. 1930

- A. S_1 is accentuated and delayed
- B. OS follows A_2 by 0.05 - 0.12 seconds
- C. A_2 - OS interval varies directly with severity of MS
- D. None of the above

A_2 - OS time interval varies inversely with the severity of the MS.

819 Which of the following correlates with the severity of mitral stenosis ?

Harrison's 18th Ed. 1931

- A Loudness of opening snap
- B Duration of mid-diastolic murmur
- C Duration of presystolic accentuation
- D All of the above

Duration of low-pitched, rumbling, diastolic murmur correlates with the severity of the stenosis in patients with preserved CO.

820 In patients with MS with RV failure, pleural effusion is on which side ?

Harrison's 18th Ed. 1931

- A Right
- B Left
- C Bilateral
- D All of the above

Pleural effusion, particularly in right pleural cavity, may occur in patients with MS and RV failure.

821 In MS, which of the following findings can be found along left sternal border ?

Harrison's 18th Ed. 1931

- A RV tap
- B High-pitched, diastolic, decrescendo blowing murmur
- C Soft, grade I or II/VI systolic murmurs
- D All of the above

RV tap along the left sternal border signifies an enlarged RV. With severe pulmonary hypertension, a pansystolic murmur, louder during inspiration, produced by functional TR may be audible along the left sternal border. Graham Steell murmur of PR, a high-pitched, diastolic, decrescendo blowing murmur along the left sternal border, results from dilation of pulmonary valve ring due to severe pulmonary hypertension. Soft, grade I or II/VI systolic murmurs are commonly heard at the apex or along the left sternal border in patients with pure MS and do not necessarily signify the presence of MR.

822 Which of the following echocardiographic technique is most useful in evaluating a patient of MS ?

Harrison's 18th Ed. 1931

- A M-mode Echocardiography
- B 2D Echocardiography with Colour Doppler studies
- C Transthoracic echocardiography (TTE) with color flow and spectral Doppler imaging
- D All of the above

Transthoracic echocardiography (TTE) with color flow and spectral Doppler imaging provides critical information in evaluation of a patient of MS.

823 In MS, Kerley B lines on X-Ray chest are apparent when the resting mean LA pressure exceeds approximately ?

Harrison's 18th Ed. 1931

- A 10 mmHg
- B 15 mmHg
- C 20 mmHg
- D 25 mmHg

Kerley B lines are fine, dense, opaque, horizontal lines most prominent in the lower and mid-lung fields resulting from distention of interlobular septae and lymphatics with edema when resting mean LA pressure > 20 mmHg.

824 Which of the following about Kerley's A lines is false ?

- A Linear opacities on CxR chest

- B Extend from periphery to hila
- C Caused by distention of anastomotic channels between peripheral & central lymphatics
- D None of the above

Kerley's A lines are linear opacities extending from periphery to hila caused by distention of anastomotic channels between peripheral & central lymphatics.

825 Which of the following about Kerley's B lines is false ?

- A Short horizontal lines on CxR chest
- B Situated perpendicularly to pleural surface at lung base
- C Represent edema of interlobular septa
- D None of the above

Kerley's B lines are short horizontal lines situated perpendicularly to pleural surface at lung base. They represent edema of the interlobular septa.

826 Which of the following about Kerley's C lines is false ?

- A Reticular opacities at lung base
- B Represent Kerley's B lines en face
- C Suggest cardiogenic pulmonary edema
- D None of the above

Kerley's C lines are reticular opacities at the lung base, representing Kerley's B lines en face suggesting cardiogenic pulmonary edema.

827 Which of the following is false about Austin Flint murmur ?

Harrison's 18th Ed. 1931

- A Apical
- B Mid-diastolic
- C Not intensified in presystole
- D None of the above

Apical mid-diastolic murmur associated with severe AR (Austin Flint murmur) is differentiated from MS because it is not intensified in presystole & becomes softer with administration of amyl nitrite.

828 Which of the following features differentiates atrial septal defect from MS ?

Harrison's 18th Ed. 1931

- A Absence of LA enlargement
- B Absence of Kerley B lines
- C Fixed splitting of S₂
- D All of the above

Atrial septal defect may be mistaken for MS as in both conditions there is clinical, ECG, and chest x-ray evidence of RV enlargement and accentuation of pulmonary vascularity. Absence of LA enlargement and of Kerley B lines and the demonstration of fixed splitting of S₂ with a grade 2 or 3 mid-systolic murmur at the mid to upper left sternal border all favor atrial septal defect over MS.

829 Auscultatory findings change markedly with body position in which of the following ?

Harrison's 18th Ed. 1931

- A Mitral Stenosis
- B Tricuspid Stenosis
- C Left atrial myxoma
- D Atrial septal defect

The auscultatory findings in left atrial myxoma change markedly with body position.

830 Levels of which of the following is elevated in left atrial myxoma ?

Harrison's 18th Ed. 1931

- A Interleukin 2 (IL-2)

- B. Interleukin 4 (IL-4)
- C. Interleukin 6 (IL-6)
- D. Interleukin 8 (IL-8)

In LA myxoma, elevated levels of serum IgG and interleukin 6 (IL-6) are found.

831 Anticoagulants are administered for how long to MS patients who have suffered systemic and/or pulmonary embolization ?

Harrison's 16th Ed. 1392

- A. At least 3 months
- B. At least 6 months
- C. At least 1 year
- D. Life long

832 Anticoagulants should be administered for how long to patients with MS who have atrial fibrillation ?

Harrison's 18th Ed. 1932

- A. At least 3 months
- B. At least 6 months
- C. At least 1 year
- D. Life long

833 In MS with AF of relatively recent origin, cardioversion should be undertaken after patient has had anticoagulant treatment for ?

Harrison's 18th Ed. 1932

- A. 1 week
- B. 2 week
- C. 3 week
- D. 4 week

Cardioversion should be undertaken after the patient has had at least 3 consecutive weeks of anticoagulant treatment to a therapeutic INR.

834 In patients with MS and AF, conversion to sinus rhythm is rarely sustained when ?

Harrison's 18th Ed. 1931

- A. LA is enlarged
- B. AF has been present for more than 1 year
- C. Severe MS
- D. All of the above

Conversion to sinus rhythm is rarely successful or sustained in patients with severe MS, particularly those in whom the LA is especially enlarged or in whom AF has been present for more than 1 year.

835 Mitral valvotomy is indicated in the symptomatic patient with isolated MS whose effective orifice is less than ?

Harrison's 18th Ed. 1932

- A. 1.0 cm²/m² body surface area
- B. 1.5 cm²/m² body surface area
- C. 2.0 cm²/m² body surface area
- D. 2.5 cm²/m² body surface area

Mitral valvotomy is indicated in symptomatic patients with isolated MS whose effective orifice is < ~1.0 cm²/m² body surface area or <1.5 cm² in normal-sized adults.

836 In pregnant patient with MS, percutaneous mitral balloon valvuloplasty (PMBV) is performed with ?

Harrison's 18th Ed. 1932

- A. CT
- B. MRI

- C. TEE
- D. Any of the above

In the pregnant patient with MS not responding to intensive medical treatment, PMBV is the preferred strategy and is performed with TEE and no or minimal x-ray exposure.

837 Successful mitral valvotomy is defined as a reduction in the mean mitral valve gradient by ?

Harrison's 18th Ed. 1932

- A. 10 %
- B. 20 %
- C. 30 %
- D. 50 %

Successful mitral valvotomy is defined by a 50% reduction in the mean mitral valve gradient and a doubling of the mitral valve area.

838 Operative mortality is maximum in which of the following ?

Harrison's 18th Ed. 1933, Table 237-3

- A. Aortic valve replacement with coronary artery bypass
- B. Mitral valve replacement with coronary artery bypass
- C. Mitral valve replacement
- D. Aortic valve replacement

839 Operative mortality is maximum in which of the following ?

Harrison's 18th Ed. 1933, Table 237-3

- A. Aortic valve repair
- B. Mitral valve repair
- C. Tricuspid valve surgery
- D. Pulmonic valve replacement

840 Which of the following is a component of mitral valve apparatus ?

Harrison's 18th Ed. 1934

- A. Chordae tendineae
- B. Papillary muscles
- C. Subjacent myocardium
- D. All of the above

Five functional components of the mitral valve apparatus are leaflets, annulus, chordae tendineae, papillary muscles, and subjacent myocardium. Dysfunction in any of these may cause MR.

841 Acute MR can occur in which of the following ?

Harrison's 18th Ed. 1934

- A. Infective endocarditis
- B. Acute myocardial infarction with papillary muscle rupture
- C. Blunt chest wall trauma
- D. All of the above

Acute MR can occur in infective endocarditis, papillary muscle rupture (post Acute MI), following blunt chest wall trauma, and rupture of chordae tendineae in MVP & IE.

842 Chronic MR can result from all except ?

Harrison's 18th Ed. 1934

- A. Ankylosing spondylitis
- B. Hypertrophic obstructive cardiomyopathy (HOCM)
- C. Mitral valve prolapse (MVP)
- D. Dilated cardiomyopathy

Chronic MR can result from rheumatic disease, mitral valve prolapse (MVP), extensive mitral annular calcification, congenital valve defects, hypertrophic obstructive cardiomyopathy (HOCM), and dilated cardiomyopathy.

843 MR occurs universally in patients with nonischemic forms of dilated cardiomyopathy when left ventricular end-diastolic dimension is ?

Harrison's 18th Ed. 1934

- A. 3.0 cm
- B. 4.0 cm
- C. 5.0 cm
- D. 6.0 cm

Annular dilatation and ventricular remodeling contribute to MR that occurs universally among patients with nonischemic forms of dilated cardiomyopathy once the left ventricular end-diastolic dimension reaches 6.0 cm.

844 In severe chronic MR, enlargement of LA places tension on ?

Harrison's 18th Ed. 1934

- A. Anterior mitral leaflet
- B. Posterior mitral leaflet
- C. Chordae tendineae
- D. All of the above

Chronic severe MR is progressive since enlargement of LA places tension on posterior mitral leaflet, pulling it away from the mitral orifice & thereby aggravating valvular dysfunction.

845 Which of the following defines severe MR ?

Harrison's 18th Ed. 1934

- A. Regurgitant volume ≥ 60 mL/beat
- B. Regurgitant fraction (RF) $\geq 50\%$
- C. Effective regurgitant orifice area ≥ 0.40 cm²
- D. All of the above

Severe nonischemic MR is defined by a regurgitant volume ≥ 60 mL/beat, regurgitant fraction (RF) $\geq 50\%$, and effective regurgitant orifice area ≥ 0.40 cm². Severe ischemic MR is usually associated with an effective regurgitant orifice area of >0.3 cm².

846 Acute severe MR & chronic severe MR are differentiated by ?

Harrison's 18th Ed. 1934

- A. v wave in the LA pressure pulse
- B. Frequency of pulmonary edema
- C. Configuration of systolic murmur
- D. All of the above

In acute severe MR, v wave in LA pressure pulse is prominent. Acute pulmonary edema is common. Murmur is early in timing and decrescendo in configuration. In chronic severe MR, LA v wave is relatively less prominent. Murmur is classically holosystolic in timing and plateau in configuration.

847 In mitral regurgitation due to papillary muscle dysfunction, the systolic murmur commences in ?

Harrison's 18th Ed. 1935

- A. Early systole
- B. Midsystole
- C. Late systole
- D. All of the above

848 Which of the following is not ordinarily heard with isolated MR ?

Harrison's 18th Ed. 1935

- A. Holosystolic murmur
- B. S₃
- C. S₄
- D. Presystolic murmur

In chronic MR, S₃ is generally absent, soft, or buried in the holosystolic murmur. In severe MR,

aortic valve may close prematurely, resulting in wide but physiologic splitting of S₂. Low-pitched S₃ occurring 0.12 - 0.17 seconds after A₂ is caused by sudden tensing of papillary muscles, chordae tendineae and valve leaflets. Short, rumbling, mid-diastolic murmur, even in the absence of structural MS may follow. S₃ is heard in acute severe MR in sinus rhythm. A presystolic murmur is not ordinarily heard with isolated MR.

849 Systolic murmur of MR, transmitted to base of heart indicates primary involvement of ?

Harrison's 18th Ed. 1935

- A. Anterior mitral leaflet
- B. Posterior mitral leaflet
- C. Both mitral leaflets
- D. Mitral valve annulus

in patients with ruptured chordae tendineae or primary involvement of the posterior mitral leaflet with prolapse or flail, regurgitant jet is eccentric, directed anteriorly, & strikes LA wall adjacent to aortic root. In this situation, systolic murmur is transmitted to base of heart. In patients with ruptured chordae tendineae, systolic murmur may have a cooing or "sea gull" quality, while a flail leaflet may cause a murmur with a musical quality. Systolic murmur of chronic MR not due to MVP is intensified by isometric exercise (handgrip) but is reduced during the strain phase of the Valsalva maneuver.

850 Rheumatic heart disease is the cause of chronic MR in what percentage of cases ?

Harrison's 17th Ed. 1469

- A. 25 %
- B. 33 %
- C. 50 %
- D. 66 %

Rheumatic heart disease is the cause of chronic MR in only about one-third of cases and occurs more frequently in males.

851 Which of the following best relates to Cabot - Locke murmur ?

N Engl J Med 2010;363:22

- A. Hyperthyroidism
- B. Anemia
- C. Pericarditis
- D. Endocarditis

Cabot - Locke murmur is a diastolic murmur heard best at the left sternal border. It sounds similar to aortic insufficiency but does not have a decrescendo. Murmur resolves with treatment of anemia. Richard Cabot was an American physician and Frank Locke was his colleague.

852 Barlow's syndrome refers to ?

Harrison's 18th Ed. 1937

- A. Bicuspid aortic stenosis
- B. Atrial myxoma
- C. Mitral valve prolapse
- D. HOCM

MVP is also termed systolic click-murmur syndrome, Barlow's syndrome, floppy-valve syndrome, and billowing mitral leaflet syndrome.

853 John Barlow belonged to which country ?

N Engl J Med 2010;363:22

- A. South Africa
- B. United Kingdom
- C. Australia
- D. Canada

South African physician John Barlow first submitted his work on mitral-valve prolapse to the journal Circulation, but the manuscript was refused for its "overstated conclusion." After considerable abbreviation of the paper, it was finally accepted & published in 1968 by British Heart Journal.

854 Which of the following statements about MVP is false ?

Harrison's 18th Ed. 1937

- A. Reduced production of type III collagen
- B. Increased concentrations of acid mucopolysaccharide
- C. Posterior leaflet is more affected than anterior
- D. None of the above

855 Mitral valve prolapse has association with heritable disorder like ?

Harrison's 18th Ed. 1937

- A. Down syndrome
- B. Osteogenesis imperfecta
- C. Turner syndrome
- D. Hemophilia

MVP is a frequent finding in patients with heritable disorders of connective tissue, including Marfan syndrome, osteogenesis imperfecta & Ehler-Danlos syndrome.

856 Mitral valve prolapse (MVP) may occur as a sequel to ?

Harrison's 18th Ed. 1937

- A. Acute rheumatic fever
- B. Ischemic heart disease
- C. Various cardiomyopathies
- D. All of the above

MVP may occur as a sequel to acute rheumatic fever, in ischemic heart disease, and in various cardiomyopathies.

857 Mitral valve prolapse (MVP) is associated with which of the following ?

Harrison's 18th Ed. 1937

- A. Ostium primum atrial septal defect
- B. Ostium secundum atrial septal defect
- C. Ventricular septal defect
- D. Patent ductus arteriosus

Mitral valve prolapse (MVP) is associated with 20% of patients with ostium secundum ASD.

858 Ventricular arrhythmias in MVP result from stress placed on ?

Harrison's 18th Ed. 1937

- A. Mitral annulus
- B. Posterior mitral leaflet
- C. Chordae tendineae
- D. Papillary muscles

MVP causes ventricular arrhythmias due to excessive stress on papillary muscles which lead to dysfunction & ischemia of papillary muscles and subjacent ventricular myocardium.

859 Which of the following valvular heart disease is more common in male ?

Harrison's 18th Ed. 1937

- A. Rheumatic MR
- B. Mitral stenosis (MS)
- C. MVP
- D. AR with associated mitral valve disease

860 Which of the following valvular heart disease is more common in female ?

Harrison's 18th Ed. 1937

- A. Rheumatic MR
- B. MVP

- C. Adult patients with symptomatic valvular AS
- D. Patients with pure or predominant valvular AR

861 Which of the following valvular heart disease is more common in female ?

Harrison's 18th Ed. 1937

- A. Rheumatic MR
- B. Tricuspid Stenosis
- C. Adult patients with symptomatic valvular AS
- D. Patients with pure or predominant valvular AR

862 In MVP, nonejection systolic click occurs how many seconds after S₁ ?

Harrison's 18th Ed. 1937

- A. 0.11 seconds
- B. 0.12 seconds
- C. 0.13 seconds
- D. 0.14 seconds

In MVP, the mid- or late (nonejection) systolic click occurs 0.14 seconds or more after S₁ and is due to sudden tensing of slack, elongated chordae tendineae or due to prolapsing mitral leaflet when it reaches its maximum excursion.

863 Which of the following about MVP is false ?

Harrison's 18th Ed. 1937

- A. Systolic clicks may be multiple
- B. High-pitched, late systolic crescendo-decrescendo murmur
- C. Late systolic murmur heard best at apex
- D. None of the above

In MVP, the late systolic murmur is high-pitched, crescendo-decrescendo configuration ("whooping" or "honking") and is heard best at the apex.

864 Systolic click & murmur of MVP occur earlier in all of the following except ?

Harrison's 18th Ed. 1937

- A. Standing
- B. Squatting
- C. During the strain phase of Valsalva maneuver
- D. All of the above

In MVP, systolic click & murmur occur earlier with standing, during strain phase of Valsalva maneuver, and with any intervention that decreases LV volume. Conversely, squatting & isometric exercises, which increase LV volume, diminish click-murmur complex of MVP thus moving it away from S₁.

865 Most frequent serious sequelae of mitral valve prolapse is ?

Harrison's 17th Ed. 1472

- A. Infective endocarditis
- B. Sudden cardiac death
- C. Severe mitral regurgitation
- D. None of the above

Sudden death is a rare complication & occurs in patients with severe MR & depressed LV systolic function. MVP is the commonest cause of isolated severe MR requiring surgical treatment.

866 Which view in echocardiography is best to diagnose mitral valve prolapse ?

Harrison's 18th Ed. 1937, Lancet 2005;365:507

- A. Parasternal long-axis view
- B. Parasternal short-axis view

- C. Four-chamber view
- D. All of the above

867 "Classic" mitral valve prolapse is defined as ?

Harrison's 18th Ed. 1937

- A. Prolapse of mitral valve
- B. Prolapse > 2 mm beyond long-axis annular plane
- C. Thickening of the valve leaflets
- D. All of the above

Echocardiographic definition of MVP is systolic displacement (in the parasternal long axis view) of mitral valve leaflets by at least 2 mm into LA superior to the plane of the mitral annulus.

868 Which of the following is true in mitral valve prolapse syndrome ?

Lancet 2005;365:507

- A. Expansion of spongiosa layer by proteoglycans
- B. Structural alterations of collagen in all components of leaflet
- C. Structurally abnormal chordae tendinae
- D. All of the above

869 Non-prolapse related systolic clicks are documented in ?

Lancet 2005;365:507

- A. Bicuspid aortic stenosis
- B. Atrial myxoma
- C. Pericarditis
- D. All of the above

870 Which of the following echocardiographic parameters is useful to risk stratify patients with mitral valve prolapse ?

Lancet 2005;365:507

- A. Leaflet thickness
- B. Redundancy
- C. Increased left-ventricular diameter
- D. All of the above

871 Transthoracic echocardiography (TTE) does not exclude ?

Lancet 2005;365:507

- A. Medial scallop prolapse
- B. Middle scallop prolapse
- C. Lateral scallop prolapse
- D. None of the above

872 Patients with mitral valve prolapse at increased risk of complications are ?

Lancet 2005;365:507

- A. Depressed left ventricular systolic function
- B. Moderate-severe mitral regurgitation
- C. Mitral leaflet thickness greater than 5 mm
- D. All of the above

873 In MVP, which of the following echocardiographic finding predicts a greater risk of severe MR ?

Lancet 2005;365:507

- A. Presence of thickened leaflets
- B. Posterior leaflet prolapse
- C. Increased left ventricular dimensions
- D. All of the above

874 What percentage of adult patients with symptomatic valvular AS are male ?

Harrison's 18th Ed. 1937

- A. 30 %
- B. 50 %
- C. 60 %
- D. 80 %

80% of adult patients with symptomatic valvular AS are male.

875 Degenerative calcification in AS occurs most commonly over and above which of the following ?

Harrison's 18th Ed. 1938

- A. Bicuspid aortic valve (BAV)
- B. Chronic trileaflet aortic valve deterioration
- C. Previous rheumatic inflammation of aortic valve
- D. All of the above

AS in adults is due to degenerative calcification of the aortic cusps and occurs most commonly on an existing disease like bicuspid aortic valve, chronic trileaflet deterioration, or previous rheumatic inflammation. Out of these, most cases have bicuspid aortic valve (BAV) disease.

876 Process of aortic valve deterioration and calcification shares many features with ?

Harrison's 18th Ed. 1938

- A. Atherosclerosis
- B. Apoptosis
- C. Mitochondrial diseases
- D. Neoplasia

The process of aortic valve deterioration & calcification shares many features with vascular atherosclerosis, including endothelial dysfunction, lipid accumulation, inflammatory cell activation, cytokine release, and upregulation of several signaling pathways.

877 Which of the following is central in the pathogenesis of aortic valve deterioration & calcification ?

Harrison's 18th Ed. 1938

- A. Foam cell
- B. Myofibroblast
- C. Endothelial cell
- D. Macrophage

In aortic valve deterioration & calcification, valvular myofibroblasts differentiate phenotypically into osteoblasts and actively produce bone matrix proteins that allow for the deposition of calcium hydroxyapatite crystals.

878 A rheumatic etiology of aortic stenosis is favored by ?

Harrison's 18th Ed. 1938

- A. History of rheumatic fever
- B. Rheumatic involvement of mitral valve
- C. Associated AR
- D. All of the above

Rheumatic AS is almost always associated with involvement of the mitral valve and with AR.

879 Which of the following is the most common congenital heart valve defect ?

Harrison's 18th Ed. 1938

- A. Congenital Pulmonic stenosis
- B. Bicuspid aortic valve (BAV)
- C. Congenital Mitral stenosis

D. Congenital Tricuspid stenosis

A bicuspid aortic valve (BAV) is the most common congenital heart valve defect and occurs in 0.5–1.4% of the population with a 2 - 4:1 male to female predominance.

880 Inheritance pattern of bicuspid aortic valve disease is ?

Harrison's 18th Ed. 1938

- A. Autosomal recessive with incomplete penetrance
- B. Autosomal recessive with complete penetrance
- C. Autosomal dominant with incomplete penetrance
- D. Autosomal dominant with complete penetrance

Inheritance pattern of bicuspid aortic valve disease is autosomal dominant with incomplete penetrance.

881 Bicuspid aortic valve disease may be associated with ?

Harrison's 18th Ed. 1938

- A. Ellis-van Creveld syndrome
- B. Noonan syndrome
- C. Holt-Oram syndrome
- D. Turner's syndrome

X-linked inheritance is suggested by prevalence of BAV disease in patients with Turner's syndrome.

882 Prevalence of BAV disease among first-degree relatives of an affected individual is ?

Harrison's 18th Ed. 1938

- A. ~ 5 %
- B. ~ 10 %
- C. ~ 15 %
- D. ~ 20 %

Prevalence of BAV disease among 1° relatives of an affected individual is ~10%.

883 Mutation in which of the following gene may be associated with BAV disease ?

Harrison's 18th Ed. 1938

- A. NOTCH1
- B. NOTCH2
- C. NOTCH3
- D. NOTCH4

Mutation in NOTCH1 gene has been described in some families suffering from BAV disease.

884 Which of the following occur commonly among patients with BAV disease ?

Harrison's 18th Ed. 1938

- A. Aortic coarctation
- B. Ascending aortic aneurysm
- C. Aortic dissection
- D. All of the above

885 Laplace relation is ?

Harrison's 18th Ed. 1938

- A. Systolic wall stress = Pressure x Radius / Wall thickness
- B. Systolic wall stress = Pressure x Wall thickness / Radius
- C. Systolic wall stress = Wall thickness x Radius / Pressure
- D. Systolic wall stress = Pressure + Radius / Wall thickness

Systolic stress developed by myocardium is predicted by Laplace relation ($S = Pr/h$, where S = systolic wall stress, P = pressure, r = radius, and h = wall thickness).

886 In normal sized adults, severe obstruction to LV outflow is considered when effective aortic orifice area is ?

Harrison's 18th Ed. 1939

- A. 0.6 cm²/m² body surface area
- B. 0.8 cm²/m² body surface area
- C. 1.0 cm²/m² body surface area
- D. 1.2 cm²/m² body surface area

A mean systolic pressure gradient >40 mmHg with a normal CO or an effective aortic orifice area < ~1.0 cm² (or ~<0.6 cm²/m² body surface area in a normal-sized adult) i.e., < ~ one-third of the normal orifice is considered to represent severe obstruction to LV outflow.

887 In AS, hypertrophied LV compresses coronary arteries causing ischemia of ?

Harrison's 18th Ed. 1939

- A. Subendocardium
- B. Myocardium
- C. Epicardium
- D. All of the above

Hypertrophied LV in AS causes an increase in myocardial oxygen requirements. Capillary density is reduced relative to wall thickness, compressive forces are increased, and the elevated LV end-diastolic pressure reduces the coronary driving pressure. Subendocardium is especially vulnerable to ischemia by this mechanism.

888 Cardinal symptom in aortic stenosis is ?

Harrison's 18th Ed. 1939

- A. Exertional dyspnea
- B. Angina pectoris
- C. Syncope
- D. All of the above

Exertional dyspnea, angina pectoris and syncope are the three cardinal symptoms in patients with pure or predominant AS.

889 Which of the following excludes the possibility of pure or predominant severe aortic stenosis ?

Harrison's 18th Ed. 1939

- A. Atrial fibrillation
- B. Absence of systolic thrill
- C. Bisferiens pulse
- D. All of the above

AF in AS suggests the possibility of associated mitral valve disease.

890 In aortic stenosis, systolic thrill is generally present at ?

Harrison's 18th Ed. 1939

- A. Base of heart
- B. In suprasternal notch
- C. Along carotid arteries
- D. All of the above

Systolic thrill is present at the base of heart, in suprasternal notch & along carotid arteries (more commonly left).

891 Which of the following is false about aortic stenosis murmur ?

Harrison's 18th Ed. 1939

- A. High pitched
- B. Rough & rasping in character
- C. Ejection systolic
- D. Loudest in second right intercostal space

Murmur of AS is ejection (mid) systolic murmur commencing shortly after S_1 , increasing in intensity to reach a peak toward middle of ejection & ending just before aortic valve closure. It is characteristically low-pitched, rough & rasping in character & loudest at the base of heart in 2nd right intercostal space. It is transmitted along carotid arteries.

892 In Gallavardin effect, murmur of AS radiates to which of the following ?

Harrison's 18th Ed. 1939

- A. Apex
- B. Carotids
- C. Back
- D. None of the above

Occasionally, murmur of AS may be transmitted downward to the apex, where it is loudest with musical quality (Gallavardin effect) and may be confused with systolic murmur of MR. In almost all patients with severe obstruction & preserved CO, the murmur of AS is at least grade III/VI.

893 Intensity of a cardiac murmur is graded (1-6) according to ?

- A. Morrison scale
- B. Mogagni scale
- C. Levine scale
- D. Osler scale

The intensity of a cardiac murmur is graded according to the Levine scale.

894 Aortic stenosis is called "mild", when the aortic valve area is ?

Harrison's 18th Ed. 1940

- A. $1.0 \text{ cm}^2 - 1.5 \text{ cm}^2$
- B. $1.5 \text{ cm}^2 - 2.0 \text{ cm}^2$
- C. $2.0 \text{ cm}^2 - 2.5 \text{ cm}^2$
- D. $2.5 \text{ cm}^2 - 3.0 \text{ cm}^2$

895 Aortic stenosis is called "moderate", when the aortic valve area is ?

Harrison's 18th Ed. 1940

- A. $1.0 \text{ cm}^2 - 1.5 \text{ cm}^2$
- B. $1.5 \text{ cm}^2 - 2.0 \text{ cm}^2$
- C. $2.0 \text{ cm}^2 - 2.5 \text{ cm}^2$
- D. $2.5 \text{ cm}^2 - 3.0 \text{ cm}^2$

Mitral stenosis is called "moderate", when the mitral valve orifice is $1.0 \text{ cm}^2 - 1.5 \text{ cm}^2$.

896 Aortic stenosis is called "severe", when aortic valve area is ?

Harrison's 18th Ed. 1940

- A. $< 1.5 \text{ cm}^2$
- B. $< 1.0 \text{ cm}^2$
- C. $< 0.5 \text{ cm}^2$
- D. $< 0.2 \text{ cm}^2$

897 Aortic sclerosis is defined echocardiographically as focal thickening or calcification of valve cusps with a peak Doppler transaortic velocity of ?

Harrison's 18th Ed. 1940

- A. ≤ 2.5 meters/second
- B. ≤ 3.5 meters/second
- C. ≤ 4.5 meters/second
- D. ≤ 5.5 meters/second

Aortic sclerosis is defined echocardiographically as focal thickening or calcification of the valve cusps with a peak Doppler transaortic velocity of ≤ 2.5 meters/second at a peak gradient $< 25 \text{ mmHg}$.

898 Which of the following Chest X-Ray findings indicate that valvular AS is not severe ?

Harrison's 18th Ed. 1940

- A. Little overall cardiac enlargement
- B. Proximal ascending aorta not dilated
- C. Absence of valvular calcification
- D. Absence of pulmonary congestion

In chest X-Ray, absence of valvular calcification in adults suggests that severe valvular AS is not present.

899 Following onset of symptoms in AS, which of the following leads to early death ?

Harrison's 18th Ed. 1940

- A. Angina pectoris
- B. Syncope
- C. Congestive heart failure
- D. None of the above

After onset of symptoms in AS, life expectancy in angina pectoris & syncope is 3 years, dyspnea - 2 years and congestive heart failure - 1.5 to 2 years.

900 Severe LV hypertrophy is present when a wall thickness is ?

Harrison's 18th Ed. 1941

- A. $> 5 \text{ mm}$
- B. $> 10 \text{ mm}$
- C. $> 15 \text{ mm}$
- D. $> 20 \text{ mm}$

Severe LV hypertrophy is present when a wall thickness is $> 15 \text{ mm}$.

901 Which of the following is the cause of aortic regurgitation due to primary valve disease ?

Harrison's 18th Ed. 1930, Table 237-1

- A. Aortic dissection
- B. Hypertension
- C. Ankylosing spondylitis
- D. Marfan's syndrome

902 Which of the following is the cause of aortic regurgitation due to both primary valve disease & primary aortic root disease ?

Harrison's 18th Ed. 1930, Table 237-1

- A. Aortitis
- B. Bicuspid aortic valve
- C. Marfan's syndrome
- D. Rheumatic fever

Causes of AR due to primary valve disease include congenital (bicuspid), endocarditis, rheumatic fever, myxomatous (prolapse), traumatic, syphilis and ankylosing spondylitis. Causes of AR due to primary aortic root disease include aortic dissection, cystic medial degeneration (Marfan's syndrome, bicuspid aortic valve, nonsyndromic familial aneurysm), aortitis and hypertension.

903 Coexistence of hemodynamically significant AS with AR occurs in which of the following ?

Harrison's 18th Ed. 1943

- A. Congenital AR
- B. Syphilis
- C. Marfan's syndrome
- D. All of the above

Coexistence of hemodynamically significant AS with AR occurs almost exclusively in patients with rheumatic or congenital AR.

904 Which of the following is the cause of aortic regurgitation due to both primary valve disease & primary aortic root disease ?

Harrison's 18th Ed. 1943

- A. Syphilis
- B. Bicuspid aortic valve
- C. Ankylosing spondylitis
- D. All of the above

Both syphilis & ankylosing spondylitis affect aortic valves. They may also be associated with cellular infiltration & scarring of media of thoracic aorta, leading to aortic dilation, aneurysm formation, & severe aortic regurgitation.

905 Which of the following condition predisposes to AR ?

Harrison's 18th Ed. 1943

- A. Marfan syndrome
- B. Ankylosing spondylitis
- C. Ventricular septal defect
- D. All of the above

Conditions that predispose to AR are Marfan syndrome, ankylosing spondylitis & VSD.

906 At autopsy, heart of which of the following lesions is heaviest ?

Harrison's 18th Ed. 1943

- A. Chronic AS
- B. Chronic AR
- C. HOCM
- D. Dilated cardiomyopathy

At autopsy, hearts of patients with chronic AR may be among the largest encountered sometimes weighing >1000 grams.

907 Early sign of LV dysfunction in chronic AR is ?

Harrison's 18th Ed. 1943

- A. Elevation of LA pressure
- B. Reduction in LVEF
- C. Elevation of PA wedge pressure
- D. Elevation of LV end-diastolic pressure

In chronic AR, both LV preload & afterload increase. When adaptive measures fail, LV function deteriorates, end-diastolic volume rises further and the forward stroke volume and EF decline. An early sign of LV dysfunction is a reduction in the EF. Deterioration of LV function often precedes the development of symptoms.

908 A large fraction of coronary blood flow occurs during ?

Harrison's 18th Ed. 1943

- A. Systole
- B. Diastole
- C. Systole + diastole
- D. Any of the above

A large fraction of coronary blood flow occurs during diastole.

909 Myocardial ischemia occurs in AR because of ?

Harrison's 18th Ed. 1943

- A. LV dilation
- B. Elevated LV systolic tension
- C. Low arterial pressure
- D. All of the above

Myocardial ischemia, particularly of the subendocardium, occurs in AR because of myocardial oxygen requirements are elevated by LV dilation, hypertrophy, and elevated LV systolic tension, and coronary blood flow may be compromised due to low arterial pressure.

910 Which of the following is a cause of acute severe AR ?

Harrison's 18th Ed. 1943

- A. Infective endocarditis
- B. Aortic dissection
- C. Nonpenetrating cardiac injury
- D. All of the above

Acute severe AR results from infective endocarditis, aortic dissection, or trauma (Nonpenetrating cardiac injury leading to rupture or avulsion of the aortic valve).

911 Which of the following about AR is false ?

Harrison's 18th Ed. 1943

- A. 3/4th of patients with predominant valvular AR are men
- B. Primary valvular AR with rheumatic mitral valve disease more common in women
- C. Exertional dyspnea is the first symptom of diminished cardiac reserve
- D. None of the above

912 Which of the following is a symptom of chronic severe AR ?

Harrison's 18th Ed. 1943

- A. Vomiting
- B. Gait disturbance
- C. Vertigo
- D. Diaphoresis

Exertional dyspnea is followed by orthopnea, paroxysmal nocturnal dyspnea, and excessive diaphoresis. Nocturnal angina that does not respond satisfactorily to sublingual nitroglycerin may be accompanied by marked diaphoresis.

913 Diaphoresis is a predominant symptom of which of the following valvular heart disease ?

Harrison's 18th Ed. 1943

- A. AS
- B. AR
- C. MS
- D. MR

914 In free AR, booming "pistol-shot" sound heard over femoral arteries is called ?

Harrison's 18th Ed. 1944

- A. Corrigan's pulse
- B. Quincke's pulse
- C. Traube's sign
- D. Duroziez's sign

In free AR, booming "pistol-shot" sound heard over femoral arteries is termed as Traube's sign.

915 Large-volume 'collapsing' water hammer peripheral pulse seen in AR is named after ?

- A. Corrigan
- B. Watson
- C. de Musset
- D. Duroziez

Large-volume 'collapsing' water hammer peripheral pulse seen in AR is named after Watson. Other peripheral signs of AR include Corrigan's pulse (rapid upstroke & collapse of carotid artery pulse), de Musset's sign (head nodding in time with heart beat), Quincke's sign (pulsation of capillary bed in nails), Traube's sign (systolic & diastolic murmurs described as 'pistol shots' heard over femoral artery when it is gradually compressed), Duroziez's sign (a double sound heard over femoral artery when it is compressed distally), Lighthouse sign (blanching & flushing of forehead), Landolfi's sign (alternating constriction & dilatation of pupil), Becker's sign (pulsations

of retinal vessels), Müller's sign (pulsations of uvula), Mayen's sign (diastolic drop of BP >15 mm Hg with arm raised), Rosenbach's sign (pulsatile liver), Gerhardt's sign (enlarged spleen), Hill's sign - a >20 mm Hg difference in popliteal & brachial systolic cuff pressures in chronic severe AR, Lincoln sign (pulsatile popliteal artery), Sherman sign (dorsalis pedis pulse is quickly located & unexpectedly prominent in age >75 years).

916 The murmur of AR is typically heard best in ?

Harrison's 18th Ed. 1944

- A. II left ICS parasternally
- B. III left ICS parasternally
- C. IV left ICS parasternally
- D. V left ICS parasternally

Murmur of chronic AR is typically high-pitched, blowing, decrescendo diastolic murmur, heard best in 3rd intercostal space along left sternal border. It seldom causes thrill.

917 When murmur of AR is heard best along right sternal border, it suggests that AR is ?

Harrison's 18th Ed. 1944

- A. Accompanied by significant MS
- B. Accompanied by Infective endocarditis
- C. Due to aneurysmal dilatation of aortic root
- D. Due to severe hypertension

When murmur of AR is heard best along right sternal border, it suggests that AR is caused by aneurysmal dilatation of aortic root.

918 Austin Flint (1812-86) was a physician of which country ?

- A. American
- B. United Kingdom
- C. Australia
- D. Canada

Austin Flint, an American physician (1812-1886) was a pioneer in the use of the stethoscope. His "A Treatise on the Principles and Practice of Medicine" (1866) was a leading textbook of medicine.

919 Which of the following murmur is heard in chronic AR ?

Harrison's 18th Ed. 1944

- A. Decrescendo diastolic murmur
- B. Mid-systolic ejection murmur
- C. Mid-to-late diastolic murmur
- D. All of the above

920 Which of the following is a feature of acute severe AR ?

Harrison's 18th Ed. 1944

- A. Soft S₁
- B. Pulse pressure not wide
- C. Soft, short, early diastolic murmur of AR
- D. All of the above

921 Most common pathologic condition associated with aortic aneurysm is ?

N Engl J Med 2004;351:1539-46

- A. Syphilis
- B. Atherosclerosis
- C. Tuberculosis
- D. Marfan's syndrome

922 In ECG of patient with AR, which of the following findings usually signify a poor prognosis ?

Harrison's 18th Ed. 1944

- A. No electrocardiographic abnormalities
- B. ST depression & T-wave inversion in I, aVL
- C. ST depression & T-wave inversion in V₅ & V₆
- D. QRS prolongation

Left axis deviation and/or QRS prolongation denote diffuse myocardial disease and signify a poor prognosis.

923 On Echocardiogram, which of the following can be found in a patient of AR ?

Harrison's 18th Ed. 1944

- A. Increased systolic excursion of posterior LV wall
- B. High-frequency diastolic fluttering of anterior mitral leaflet
- C. Dilatation of aortic annulus
- D. All of the above

A rapid, high-frequency fluttering of the anterior mitral leaflet produced by the impact of the regurgitant jet is a characteristic finding in 2D echocardiogram of AR patient.

924 Which of the following findings in color flow Doppler imaging suggest severe AR ?

Harrison's 18th Ed. 1944

- A. Central jet width > 65 % of left ventricular outflow tract
- B. Regurgitant volume > 60 mL/beat
- C. Regurgitant fraction > 50%
- D. All of the above

With severe AR, central jet width assessed by color flow Doppler imaging exceeds 65% of left ventricular outflow tract, regurgitant volume is >=60 mL/beat, regurgitant fraction is >=50%, and diastolic flow reversal in the proximal descending thoracic aorta is seen.

925 Which of the following is contraindicated in the treatment of acute aortic regurgitation ?

Harrison's 18th Ed. 1944

- A. Intravenous diuretics
- B. Vasodilators (sodium nitroprusside)
- C. Intraaortic balloon counterpulsation
- D. Surgery

Patients with acute severe AR may respond to IV diuretics and vasodilators like sodium nitroprusside. Surgery is the treatment of choice and is usually necessary within 24 hours of diagnosis. Intraaortic balloon counterpulsation is contraindicated. Beta blockers are also best avoided as they may reduce CO further.

926 In AR, which of the following drugs can delay the need for surgery ?

Harrison's 16th Ed. 1401

- A. Digitalis glycosides
- B. Diuretics
- C. Nondihydropyridine calcium channel blockers
- D. Long-acting nifedipine

927 In AR, operation should be carried out in ?

Harrison's 18th Ed. 1946

- A. LVEF < 50%
- B. LV end-systolic volume > 55 mL/m²
- C. Acute, severe AR
- D. All of the above

Surgery should be carried out in asymptomatic patients with severe AR and progressive LV dysfunction defined by an LVEF <50%, an LV end-systolic dimension >55 mm or end-systolic volume >55 mL/m², or an LV diastolic dimension >75 mm.

928 Which of the following about tricuspid stenosis is false ?

Harrison's 18th Ed. 1946

- A. Generally congenital in origin
- B. More common in women than men
- C. Does not occur as an isolated lesion
- D. Rheumatic TS commonly associated with TR

Tricuspid stenosis (TS) is generally rheumatic in origin and more common in women than men. It does not occur as an isolated lesion and is usually associated with MS. Rheumatic TS is commonly associated with some degree of TR. Nonrheumatic causes of TS are rare.

929 Systemic venous congestion sets in when mean RA - RV diastolic pressure gradient is ?

Harrison's 18th Ed. 1946

- A. 1 mm Hg
- B. 2 mm Hg
- C. 3 mm Hg
- D. 4 mm Hg

A diastolic pressure gradient between the RA and RV defines TS. A mean diastolic pressure gradient of 4 mmHg is usually sufficient to elevate the mean RA pressure to levels that result in systemic venous congestion (hepatomegaly, ascites, edema).

930 In Tricuspid stenosis (TS), jugular veins may show ?

Harrison's 18th Ed. 1946

- A. Giant 'a' wave
- B. Less conspicuous 'v' wave
- C. Slow 'y' descent
- D. All of the above

In TS with sinus rhythm, jugular veins are distended with giant "a" waves. "v" waves are less conspicuous with a slow "y" descent.

931 Which of the following statements is false ?

Harrison's 18th Ed. 1946-47

- A. Development of MS precedes that of TS
- B. Presence of TS can mask clinical features of MS
- C. TS is almost always accompanied by significant TR
- D. None of the above

Presence of TS can mask hemodynamic & clinical features of MS. Development of MS generally precedes that of TS. TS is almost always accompanied by significant TR.

932 Murmur of which of the following valvular heart disease is heard best over the xiphoid process ?

Harrison's 18th Ed. 1947

- A. TS
- B. TR
- C. VSD
- D. All of the above

Murmur of TS is best heard along left lower sternal margin and over xiphoid process.

933 In sinus rhythm, murmur of TS is most prominent during ?

Harrison's 18th Ed. 1947

- A. Early diastole
- B. Mid systole
- C. Presystole
- D. All of the above

Murmur of TS is most prominent during presystole in patients with sinus rhythm. It is augmented during inspiration, reduced during expiration and during the strain phase of Valsalva maneuver.

934 Which of the following is false about combined MS & TS ?

Harrison's 18th Ed. 1947

- A. Absence of ECG evidence of RVH
- B. Prominence of RA & SVC without enlarged PA on CxR
- C. Less evidence of pulmonary vascular congestion
- D. None of the above

In combined MS & TS there is absence of ECG evidence of right ventricular hypertrophy (RVH) in a patient with right-sided heart failure. Chest x-ray shows prominence of RA & superior vena cava without much enlargement of PA with less evidence of pulmonary vascular congestion.

935 Thromboembolic complications are most when mechanical valves are used for which valve replacement ?

Harrison's 18th Ed. 1948

- A. Mitral
- B. Tricuspid
- C. Aortic
- D. Pulmonary

Mechanical valves in the tricuspid position are more prone to thromboembolic complications than in other positions.

936 Functional tricuspid regurgitation (TR) may be observed in ?

Harrison's 18th Ed. 1948

- A. Inferior MI
- B. Ischemic cardiomyopathy
- C. Idiopathic dilated cardiomyopathy
- D. All of the above

937 Severe pulmonary artery hypertension is defined when pulmonary artery systolic pressure is ?

Harrison's 18th Ed. 1948

- A. > 25 mm Hg
- B. > 35 mm Hg
- C. > 45 mm Hg
- D. > 55 mm Hg

Severe pulmonary artery hypertension is defined when pulmonary artery systolic pressure is > 55 mm Hg.

938 Carcinoid heart disease predominantly affects which of the following heart valves ?

Harrison's 18th Ed. 1948

- A. Mitral
- B. Tricuspid
- C. Aortic
- D. Pulmonary

Infarction of RV papillary muscles, tricuspid valve prolapse, carcinoid heart disease, endomyocardial fibrosis, radiation, infective endocarditis, and trauma may produce TR.

939 Carcinoid syndrome may cause ?

Harrison's 18th Ed. 1948

- A. Tricuspid regurgitation
- B. Pulmonic stenosis
- C. Pulmonic regurgitation
- D. All of the above

Carcinoid syndrome may cause TR, pulmonic stenosis and/or regurgitation.

940 Which of the following is seen in jugular venous pulsations in tricuspid regurgitation ?

Harrison's 18th Ed. 1948

- A. No x descent
- B. Prominent c-v wave
- C. Rapid y descent
- D. All of the above

In severe TR, RA pressure pulse shows no x descent during early systole but a prominent c-v wave with a rapid y descent.

941 In RA pressure pulse, prominent c-v wave with rapid y descent is typical of ?

Harrison's 18th Ed. 1948

- A. Ebstein's anomaly
- B. Tricuspid regurgitation
- C. Constrictive pericarditis
- D. All of the above

In severe TR, RA pressure pulse may exhibit no x descent during early systole but a prominent c-v wave with a rapid y descent.

942 Carvallo's sign is related to which of the following ?

Harrison's 18th Ed. 1948

- A. Aortic regurgitation
- B. Mitral regurgitation
- C. Tricuspid regurgitation
- D. Pericarditis

A prominent RV pulsation along the left parasternal region and a blowing holosystolic murmur along the lower left sternal margin, which may be intensified during inspiration & reduced during expiration or the strain of the Valsalva maneuver (Carvallo's sign), are characteristic findings of TR.

943 A positive hepatojugular reflex is seen in ?

Harrison's 18th Ed. 1948

- A. TS
- B. TR
- C. PS
- D. All of the above

In TR, systemic venous congestion causes right-sided heart failure manifesting as marked hepatomegaly, ascites, pleural effusions, edema, systolic pulsations of liver, and a positive hepatojugular reflex.

944 Hepatic vein systolic flow reversal on Doppler echocardiography is a feature of ?

Harrison's 18th Ed. 1948

- A. TS
- B. TR
- C. PS
- D. All of the above

945 On Doppler examination, "hepatic vein systolic flow reversal" is a feature of ?

Harrison's 18th Ed. 1948

- A. Constrictive pericarditis
- B. Tricuspid regurgitation
- C. SVC obstruction
- D. All of the above

On Doppler examination, severe TR is accompanied by hepatic vein systolic flow reversal.

946 Which of the following heart valves is least affected by infective endocarditis ?

Harrison's 18th Ed. 1948

- A. Mitral
- B. Tricuspid
- C. Aortic
- D. Pulmonary

Pulmonic valve is affected by rheumatic fever far less frequently than are the other valves, and it is uncommonly a nidus for infective endocarditis.

947 Which of the following is false about 'Graham Steell murmur' ?

Harrison's 18th Ed. 1948

- A. High-pitched
- B. Decrescendo, diastolic
- C. Along left sternal border
- D. None of the above

Graham Steell murmur due to severe pulmonary hypertension is a high-pitched, decrescendo, diastolic blowing murmur along the left sternal border.

948 Pulmonic regurgitation occurs universally among patients who have undergone which of the following ?

Harrison's 18th Ed. 1948

- A. Mustard operation
- B. Repair of tetralogy of Fallot
- C. Senning operation
- D. Ross procedure

Pulmonic regurgitation occurs universally among patients who have undergone childhood repair of tetralogy of Fallot with reconstruction of the RV outflow tract.

949 Which of the following drug can cause aortic insufficiency ?

- A. Methysergide
- B. Fenfluramine
- C. Penicillin
- D. Cisplatin

Aortic insufficiency can be caused by serotonin reuptake inhibitors, specifically medications containing fenfluramine or dexfenfluramine isotopes, and dopamine agonists.

950 Which of the following can produce mixed valve lesions ?

Harrison's 18th Ed. 1948

- A. Mediastinal radiation
- B. Carcinoid heart disease
- C. Marfan's syndrome
- D. All of the above

951 Bioprosthetic valves are indicated in ?

Harrison's 18th Ed. 1949

- A. Elderly (> 65 years)
- B. Women who expect to become pregnant
- C. In whom anticoagulation is contraindicated
- D. All of the above

Bioprostheses are preferred for patients >65 years, for women who expect to become pregnant & for those who refuse to take anticoagulation or for whom anticoagulation is contraindicated.

Chapter 238. Cardiomyopathy and Myocarditis

952 Cardiomyopathy can be a result of which of the following ?

Harrison's 18th Ed. 1951

- A. Hypertension
- B. Congenital or acquired valvular abnormality
- C. Pericardial abnormalities
- D. None of the above

Cardiomyopathies are a group of diseases that affect heart muscle itself & are not the result of hypertension or congenital or acquired valvular, coronary or pericardial abnormalities.

953 In the diagnosis of restrictive cardiomyopathy, which of the following has most relevance ?

Harrison's 18th Ed. 1951

- A. Atrial size
- B. Left ventricular diastolic dimension
- C. Left ventricular wall thickness
- D. Arrhythmia

Prominent atrial enlargement is a distinguishing feature of restrictive cardiomyopathy.

954 Most familial cardiomyopathies are inherited in which of the following pattern ?

Harrison's 18th Ed. 1951

- A. Autosomal dominant
- B. Autosomal recessive
- C. X-linked inheritance
- D. Any of the above

Most familial cardiomyopathies are inherited in an autosomal dominant pattern, with occasional autosomal recessive and X-linked inheritance.

955 Defects in sarcomeric proteins of myosin, actin & troponin are associated with ?

Harrison's 18th Ed. 1951

- A. Dilated cardiomyopathy
- B. Restrictive cardiomyopathy
- C. Hypertrophic cardiomyopathy
- D. All of the above

Defects in sarcomeric proteins of myosin, actin, and troponin are mostly associated with hypertrophic cardiomyopathy.

956 Most of the identified genetic defects in the Z-disk and cytoskeleton are associated with ?

Harrison's 18th Ed. 1952

- A. Dilated cardiomyopathy
- B. Restrictive cardiomyopathy
- C. Hypertrophic cardiomyopathy
- D. All of the above

Desmin forms intermediate filaments that connect the nuclear and plasma membranes, Z-lines, and the intercalated disks between muscle cells. Desmin mutations impair the transmission of force and signaling for both cardiac & skeletal muscle leading to a peripheral myopathy and a dilated cardiomyopathy. Most of the identified genetic defects in the Z-disk and cytoskeleton are associated with dilated cardiomyopathy.

957 Which of the following is a sarcomeric protein ?

Harrison's 18th Ed. 1956, Figure 238-1

- A. Actin
- B. Myosin
- C. Tropomyosin
- D. All of the above

958 Which of the following is related to "myocyte stabilizing and connecting the cell membrane to intracellular structures" ?

Harrison's 18th Ed. 1956, Figure 238-1

- A. Sarcomeric proteins
- B. Dystrophin complex
- C. Desmosome complex
- D. All of the above

959 Which of the following is related to "cell-cell connections and myocyte stability" ?

Harrison's 18th Ed. 1956, Figure 238-1

- A. Sarcomeric proteins
- B. Dystrophin complex
- C. Desmosome complex
- D. All of the above

Sarcomeric proteins include actin, myosin, tropomyosin, and the associated regulatory proteins. Dystrophin complex stabilizes and connects the cell membrane to intracellular structures. Desmosome complexes are associated with cell-cell connections and stability.

960 Abnormal dystrophin can be acquired in infection by ?

Harrison's 18th Ed. 1952

- A. Coxsackie virus
- B. Varicella-zoster virus
- C. Herpes simplex virus (HSV) type 1
- D. Epstein-Barr virus

Abnormal dystrophin can be acquired when Coxsackie virus cleaves dystrophin in viral myocarditis.

961 What proportion of congestive heart failure (CHF) is due to dilated cardiomyopathy ?

Harrison's 17th Ed. 1481

- A. $\frac{1}{4}$
- B. $\frac{1}{2}$
- C. $\frac{1}{3}$
- D. $\frac{3}{4}$

About one in three cases of CHF is due to dilated cardiomyopathy, with the remainder the consequence of coronary artery disease.

962 What proportion of dilated cardiomyopathy are familial ?

Harrison's 18th Ed. 1953

- A. $\frac{1}{4}$
- B. $\frac{1}{2}$
- C. $\frac{1}{3}$
- D. $\frac{3}{4}$

Up to one-third of cases of dilated cardiomyopathy may be familial.

963 Mostly, familial forms of DCM are due to mutations in ?

Harrison's 17th Ed. 1481

- A. Genes encoding nuclear envelope protein lamin A/C
- B. Genes encoding sarcomeric proteins
- C. Mitochondrial genes
- D. None of the above

Most commonly, familial forms of DCM are due to mutations in genes encoding sarcomeric proteins like alpha-cardiac actin, beta- & alpha-myosin, heavy chain alpha-tropomyosin & troponins T, I, and C. Mutations in gene encoding nuclear envelope protein lamin A/C are responsible for DCM associated with atrioventricular (AV) conduction disorder that may cause sudden cardiac death (SCD). Mutations in mitochondrial genes have also been reported in DCM.

964 Upper limit of normal of the weight of human heart is ?

Harrison's 18th Ed. 1957, Figure 238-2

- A. 320 grams
- B. 340 grams
- C. 360 grams
- D. 380 grams

Upper limit of normal of the weight of human heart is 360 grams.

965 Histopathological feature of a dilated cardiomyopathy specimen is ?

Harrison's 18th Ed. 1958, Figure 238-4

- A. Interstitial fibrosis
- B. Increased myocyte size
- C. Enlarged, irregular nuclei
- D. All of the above

Microscopically, a dilated cardiomyopathy specimen would show nonspecific changes of interstitial fibrosis and myocyte hypertrophy characterized by increased myocyte size and enlarged, irregular nuclei.

966 Which of the following is a feature of cardiac remodeling ?

Harrison's 16th Ed. 1408

- A. Impaired ventricular systolic pump function
- B. Cardiac enlargement
- C. Cardiac hypertrophy
- D. All of the above

Left and/or right ventricular systolic pump function is impaired, leading to progressive cardiac enlargement and hypertrophy, a process called remodeling.

967 Myocardial damage leading to dilated cardiomyopathy can be produced by which of the following ?

Harrison's 17th Ed. 1481

- A. Toxic agents
- B. Metabolic factors
- C. Infectious agents
- D. All of the above

DCM is either familial or the end result of myocardial damage produced by known or unknown infectious, metabolic, or toxic agents.

968 In which of the following conditions, dilated cardiomyopathy is reversible ?

Harrison's 17th Ed. 1481

- A. Alcohol abuse
- B. Pregnancy
- C. Thyroid disease
- D. All of the above

Reversible form of dilated cardiomyopathy may be found with alcohol abuse, pregnancy, thyroid disease, cocaine use, and chronic uncontrolled tachycardia. Obesity & sleep apnea increases the risk of developing heart failure.

969 ECG of a DCM patient may show all of the following except ?

Harrison's 17th Ed. 1482

- A. Atrial fibrillation

- B. Ventricular arrhythmias
- C. High voltage
- D. Intraventricular conduction defects

ECG in a case of DCM shows sinus tachycardia or atrial fibrillation, ventricular arrhythmias, left atrial abnormality, diffuse nonspecific ST-T-wave abnormalities & sometimes intraventricular conduction defects and low voltage.

970 Which of the following should be avoided in dilated cardiomyopathy ?

Harrison's 17th Ed. 1482

- A. Alcohol
- B. Calcium channel blockers
- C. Nonsteroidal anti-inflammatory drugs
- D. All of the above

Alcohol, calcium channel blockers & NSAIDs should be avoided in DCM.

971 Which of the following drugs should be avoided in a patient of dilated cardiomyopathy ?

Harrison's 17th Ed. 1482

- A. Digitalis
- B. Beta adrenergic blocker
- C. Calcium channel blocker
- D. Spironolactone

Standard therapy of heart failure with salt restriction, ACE inhibitors or angiotensin II receptor blocker, diuretics, and digitalis produces symptomatic improvement. Most patients should be treated with a beta adrenergic blocker. Spironolactone should be added for most patients with recent or current advanced heart failure.

972 Cardiac involvement is common in which of the following conditions ?

Harrison's 17th Ed. 1482

- A. Duchenne's progressive muscular dystrophy
- B. Myotonic dystrophy
- C. Friedreich's ataxia
- D. All of the above

Cardiac involvement is common in Duchenne's progressive muscular dystrophy, Myotonic dystrophy and Friedreich's ataxia.

973 Cardiomyopathy-neutropenia syndrome is also called ?

- A. Pompe disease
- B. Barth syndrome
- C. Holt-Oram syndrome
- D. Fraser syndrome

Barth syndrome (BTHS) is named after Dr. Peter Barth (Netherlands). It is found exclusively in males. It is also known as 3-Methylglutaconic aciduria type II and Cardiomyopathy-neutropenia syndrome. It is due to mutations in BTHS gene, tafazzin (TAZ) located at Xq28, the long arm of X chromosome and is associated with cardiolipin molecules in the electron transport chain & mitochondrial membrane structure. Syndrome consists of metabolism distortion, delayed motor skills, stamina deficiency, hypotonia, chronic fatigue, delayed growth, cardiomyopathy, and compromised immune system.

Myocarditis

974 Ventricular tachyarrhythmias may be a feature of ?

Harrison's 18th Ed. 1954

- A. Viral myocarditis
- B. Sarcoidosis

- C. Giant cell myocarditis
- D. All of the above

Ventricular tachyarrhythmias dominate the presentation in viral myocarditis, sarcoidosis and giant cell myocarditis.

975 Which of the following viruses most often produces clinically significant acute myocarditis ?

Harrison's 17th Ed. 1486

- A. Influenza
- B. Coxsackievirus A
- C. Coxsackievirus B
- D. HIV

While almost every infectious agent is capable of producing myocarditis, clinically significant acute myocarditis in USA is caused by viruses, especially coxsackievirus B.

976 Myocarditis can result from ?

Harrison's 17th Ed. 1486

- A. Infectious process
- B. Hypersensitivity to drugs
- C. Radiation
- D. All of the above

Myocarditis results from infections, drug hypersensitivity, radiation, chemicals or physical agents.

977 Chagas disease is caused by ?

Harrison's 18th Ed. 1957

- A. Toxoplasma gondii
- B. Trypanosoma cruzi
- C. Schistosoma haematobium
- D. Dermatobia hominis

Chagas disease caused by protozoan Trypanosoma cruzi is transmitted by the bite of insect vector reduvid bug.

978 Protozoan Trypanosoma cruzi can be transmitted by ?

Harrison's 18th Ed. 1957

- A. Blood transfusion
- B. Organ donation
- C. Mother to fetus
- D. All of the above

Transmission of protozoan T. cruzi can also occur through blood transfusion, organ donation, from mother to fetus, and occasionally orally.

979 Which of the following is a typical feature of Chagas' disease in ECG ?

Harrison's 18th Ed. 1958

- A. Atrial fibrillation
- B. Ventricular tachyarrhythmias
- C. Conduction system abnormalities
- D. Nonspecific ST-T abnormalities

Features typical of Chagas' disease are conduction system abnormalities, particularly sinus node and atrioventricular (AV) node dysfunction and right bundle branch block. Atrial fibrillation and ventricular tachyarrhythmias also occur.

980 Multiple left ventricular aneurysm formation is a feature of which of the following ?

Harrison's 18th Ed. 1958

- A. Diphtheritic myocarditis
- B. Myocarditis in patients with HIV

- C. Chagas disease
- D. Lyme carditis

Cardiac involvement in Chagas heart disease is characterized by dilatation of cardiac chambers, fibrosis & thinning of ventricular wall, aneurysm formation in left ventricular apex and mural thrombi that may embolize to pulmonary and systemic circulations.

981 Which of the following drug is used in the treatment of Chagas' disease ?

Harrison's 18th Ed. 1958

- A. Pentamidine
- B. Benznidazole
- C. Suramin
- D. Melarsoprol

Antiparasitic therapy for Chagas' disease include benznidazole and nifurtimox.

982 Cardiac abnormality most common in Lyme disease is ?

Harrison's 18th Ed. 1959

- A. Myopericarditis
- B. Left ventricular dysfunction
- C. Right ventricular dysfunction
- D. Conduction abnormalities

In Lyme disease, conduction abnormalities are the most common manifestations of cardiac involvement.

983 On auscultation in a case of myocarditis, which of the following murmur is frequently heard ?

Harrison's 17th Ed. 1486

- A. Mitral stenosis
- B. Mitral regurgitation
- C. Aortic stenosis
- D. Aortic regurgitation

Auscultatory findings in a case of myocarditis include muffled S1 with S3 & a murmur of mitral regurgitation. Pericardial rub may be heard in patients with associated pericarditis.

984 In HIV myocarditis, the most common finding is ?

Harrison's 17th Ed. 1487

- A. Pericarditis
- B. Left ventricular dysfunction
- C. Right ventricular dysfunction
- D. Conduction abnormalities

In HIV patients, the most common finding is left ventricular dysfunction that in some cases appears to be due to infiltration of myocardium by virus.

985 Cardiomegaly & severe CHF in diphtheritic myocarditis appear after how many weeks of illness ?

Harrison's 17th Ed. 1487

- A. First
- B. Second
- C. Third
- D. Fourth

Cardiomegaly & severe CHF in diphtheritic myocarditis appear after the first week of illness.

986 Giant cell myocarditis may occur in association with ?

Harrison's 18th Ed. 1961

- A. Thymoma
- B. Thyroiditis

- C. Pernicious anemia
- D. All of the above

Associated conditions of giant cell myocarditis are thymomas, thyroiditis, pernicious anemia, other autoimmune diseases.

987 Myocarditis may result from hypersensitivity to which of the following drugs ?

Harrison's 17th Ed. 1486

- A. Tricyclic antidepressants
- B. Antibiotics
- C. Antipsychotics
- D. All of the above

Myocarditis may result from hypersensitivity to drugs like tricyclic antidepressants, antibiotics & antipsychotics.

988 Myocarditis may result from hypersensitivity to which of the following drugs ?

Harrison's 18th Ed. 1961

- A. Thiazides
- B. Antibiotics
- C. Methyl dopa
- D. All of the above

Myocarditis may result from hypersensitivity to antibiotics, thiazides, anticonvulsants, indomethacin, and methyl dopa.

989 Peripartum cardiomyopathy usually develops in which trimester of pregnancy ?

Harrison's 18th Ed. 1961

- A. First
- B. Second
- C. Third
- D. All of the above

Cardiac dilatation & CHF of unexplained cause may develop during last trimester of pregnancy or within 6 months after delivery.

990 Likelihood of peripartum cardiomyopathy is more in ?

Harrison's 17th Ed. 1482

- A. Multiparous
- B. > 30 years
- C. Of African ancestry
- D. All of the above

Patient who develops peripartum cardiomyopathy typically is multiparous, of African ancestry and >30 years of age.

991 Risk factor for peripartum cardiomyopathy is ?

Harrison's 18th Ed. 1961

- A. Increased parity
- B. Use of tocolytic therapy for premature labor
- C. Preeclampsia or toxemia of pregnancy
- D. All of the above

Risk factors for peripartum cardiomyopathy are increased maternal age, increased parity, twin pregnancy, malnutrition, use of tocolytic therapy for premature labor, and preeclampsia or toxemia of pregnancy.

992 Polymorphisms of which of the following genes increases the likelihood of alcoholic cardiomyopathy ?

Harrison's 18th Ed. 1961

- A. Angiotensin-converting enzyme
- B. β_1 - adrenergic receptor
- C. β_2 - adrenergic receptor
- D. All of the above

Polymorphisms of the genes encoding alcohol dehydrogenase and the angiotensin-converting enzyme increase the likelihood of alcoholic cardiomyopathy.

993 Alcohol consumption necessary to produce cardiomyopathy is ?

Harrison's 18th Ed. 1961

- A. 1 ounce of pure ethanol daily for 5 - 10 years
- B. 2 ounces of pure ethanol daily for 5 - 10 years
- C. 3 ounces of pure ethanol daily for 5 - 10 years
- D. 4 ounces of pure ethanol daily for 5 - 10 years

Alcohol consumption necessary to produce cardiomyopathy in an otherwise normal heart is about 4 ounces of pure ethanol daily for 5 - 10 years.

994 "Holiday heart syndrome" is the term used for cardiotoxicity produced by ?

Harrison's 17th Ed. 1482

- A. Alcohol
- B. Tobacco
- C. Cocaine
- D. Amphetamine

Holiday heart syndrome is a state of alcoholic cardiotoxicity presenting as recurrent supraventricular or ventricular tachyarrhythmias without overt heart failure due to alcoholic binge drinking.

995 Which of the following arrhythmias is most frequent in "Holiday heart syndrome" ?

Harrison's 17th Ed. 1482

- A. Atrial flutter
- B. Atrial fibrillation
- C. Ventricular premature depolarizations
- D. Ventricular tachycardia

In holiday heart syndrome, atrial fibrillation is the most common arrhythmia, followed by atrial flutter and ventricular premature depolarizations.

996 What quantity of alcohol consumption has been shown to be cardioprotective ?

Harrison's 17th Ed. 1482

- A. 10 - 20 grams / day
- B. 20 - 30 grams / day
- C. 30 - 40 grams / day
- D. 40 - 50 grams / day

Alcohol consumption in moderate quantity (20 - 30 grams/day) appears to be cardioprotective.

997 Which of the following drugs should be avoided while treating cocaine-induced cardiotoxicity ?

Harrison's 16th Ed. 1410

- A. Nitrates
- B. Calcium channel blockers
- C. Beta-adrenergic blockers
- D. Benzodiazepines

Nitrates, calcium channel blockers (to reduce coronary spasm) & benzodiazepines are used to treat cocaine-induced cardiotoxicities. Beta-adrenergic blockers should be avoided.

- 998 Which of the following is a cardioprotective agent when doxorubicin (Adriamycin) is given to a patient ?

Harrison's 17th Ed. 1483

- A. Erythropoietin
- B. Dexrazoxone
- C. Amiodarone
- D. Cyclophosphamide

Iron chelator dexrazoxone is cardioprotective and reduces risk of doxorubicin (Adriamycin) cardiotoxicity. Recovery of cardiac function occurs with aggressive use of ACE inhibitors.

- 999 Which of the following drug causes dilated cardiomyopathy ?

Harrison's 18th Ed. 1962

- A. Trastuzumab (Herceptin)
- B. Ifosfamide
- C. Cyclophosphamide
- D. All of the above

- 1000 Which of the following chemotherapeutic agents can cause recurrent coronary spasm ?

Harrison's 18th Ed. 1962

- A. Cyclophosphamide
- B. Ifosfamide
- C. Cisplatin
- D. All of the above

5-Fluorouracil, cisplatin, and some other alkylating agents can cause recurrent coronary spasm.

- 1001 Which of the following drugs can cause cardiotoxicity with chronic use ?

Harrison's 18th Ed. 1962

- A. Hydroxychloroquine
- B. Chloroquine
- C. Emetine
- D. All of the above

- 1002 Heart failure with "preserved" ejection fraction is best applied to ?

Harrison's 18th Ed. 1962

- A. Hyperthyroidism
- B. Hypothyroidism
- C. Obesity
- D. Diabetes

Diabetes is a typical factor, along with hypertension, advanced age, and female gender, in heart failure with "preserved" ejection fraction.

- 1003 Which of the following conditions is associated with a high risk of death in patients with viral myocarditis ?

Harrison's 16th Ed. 1413

- A. Pulmonary hypertension
- B. Pericardial friction rub
- C. Arrhythmias
- D. Heart failure

Patients with viral myocarditis & pulmonary hypertension are at a particularly high risk of death.

- 1004 Deficiency of which of the following plays a pathogenetic role in peripartum cardiomyopathy ?

Harrison's 17th Ed. 1488

- A. Gold
- B. Zinc
- C. Copper
- D. Selenium

Pathogenetic factors in peripartum cardiomyopathy include low socioeconomic status, high parity, prolonged lactation, excessive dietary salt intake & selenium deficiency.

- 1005 "Wet beri-beri heart disease" is characterized by all except ?

Harrison's 17th Ed. 1488

- A. Third heart sound
- B. Cold extremities
- C. Reduced ECG voltage
- D. Prolongation of QT interval

"Wet beri-beri heart disease" is characterized by high cardiac output failure state & is associated with tachycardia, wide pulse pressure, S3, & warm extremities. ECG shows reduced voltage, diffuse T-wave abnormalities & prolongation of QT interval.

- 1006 While treating "wet beri-beri heart disease" with thiamine, which of the following drugs should be accompanied ?

Harrison's 17th Ed. 1488

- A. Digoxin
- B. Theophyllin
- C. Quinidine
- D. Diuretics

Response to thiamine in "wet beri-beri heart disease" is dramatic & must be accompanied by diuretics.

- 1007 Which of the following diseases is associated with selenium deficiency ?

- A. Keshan Disease
- B. Kashin-Beck Disease
- C. Myxedematous Endemic Cretinism
- D. All of the above

Specific diseases associated with selenium deficiency are Keshan Disease, Kashin-Beck Disease (Big Bone disease) and Myxedematous Endemic Cretinism.

- 1008 Which of the following is best absorbed & utilized form of selenium ?

J Am College of Nutr 2001;20:1-4

- A. Selenothiamine
- B. Selenoarginine
- C. Selenoleucine
- D. Selenomethionine

Selenomethionine is considered to be the best absorbed and utilized form of selenium.

- 1009 Recommended Dietary Allowances (RDA) for selenium for adults is ?

Harrison's 16th Ed. 419

- A. 50 µg/day
- B. 500 µg/day
- C. 5000 µg/day
- D. 50000 µg/day

Recommended Dietary Allowances (RDA) for selenium for adults is 50-200 µg/day.

- 1010 Clinical syndrome of Hemochromatosis includes ?

Harrison's 18th Ed. 1963

- A. Cirrhosis

- B. Diabetes
- C. Hypogonadism
- D. All of the above

The clinical syndrome of Hemochromatosis includes cirrhosis, diabetes & hypogonadism.

1011 Which of the following is false about Hemochromatosis ?

Harrison's 18th Ed. 1963

- A. May be due to iron overload as in hemolytic anemia
- B. Iron deposited in perinuclear area of cardiomyocytes
- C. Transferrin saturation > 60 % for men
- D. None of the above

1012 In right ventricular dysplasia, there is progressive replacement of right ventricular wall with ?

Harrison's 18th Ed. 1963

- A. Elastic tissue
- B. Collagen tissue
- C. Adipose tissue
- D. Mucopolysaccharides

RV dysplasia is a familial cardiomyopathy marked by progressive replacement of right ventricular wall with adipose tissue. Ventricular arrhythmias are common & sudden death is a constant threat.

1013 Which of the following is mostly affected in Arrhythmogenic Right Ventricular Cardiomyopathy/Dysplasia (ARVC/D)

Harrison's 18th Ed. 1963

- A. Nuclear membrane
- B. Endoplasmic reticulum
- C. Mitochondria
- D. Desmosomes

ARVC/D is an autosomal dominant disorder caused by multiple mutations of several genes encoding proteins that constitute desmosomes, structures that maintain normal contacts between cells leading to detachment of myocytes with consequent myocyte apoptosis and fibrofatty replacement.

1014 Which of the following best relates to genetic defect in the desmosomal protein ?

Harrison's 18th Ed. 1963

- A. Strabismus
- B. Gait disturbance
- C. Woolly hair
- D. Cyanosis

Genetic defects in proteins of the desmosomal complex disrupt myocyte junctions & adhesions, leading to replacement of myocardium by deposits of fat. This same protein also affects hair & skin, leading in to a distinct syndrome of "woolly hair" and thickened palms and soles.

1015 Drooping eyelids is a feature of ?

Harrison's 18th Ed. 1963

- A. Hemochromatosis
- B. Duchenne's and Becker's dystrophy
- C. Mitochondrial myopathies
- D. Hypothyroidism

Mitochondrial myopathies show the characteristic "ragged red fiber" appearance. Some patients with mitochondrial myopathy have characteristic drooping eyelids.

1016 Cardinal clinical feature of left ventricular noncompaction is ?

Harrison's 18th Ed. 1963

- A. Ventricular arrhythmias
- B. Embolic events

- C. Heart failure
- D. All of the above

The three cardinal clinical features of left ventricular noncompaction are ventricular arrhythmias, embolic events, and heart failure.

1017 Which of the following is false about Left Ventricular Noncompaction ?

Harrison's 18th Ed. 1963

- A. Congenital cardiomyopathy
- B. Abnormal embryogenesis
- C. Multiple deep trabeculations into myocardium
- D. None of the above

Left ventricular noncompaction (LVNC) is a congenital cardiomyopathy that may present at any age with symptoms of CHF, thromboembolism or ventricular arrhythmias due to arrest of normal embryogenesis, with persistence of multiple deep trabeculations into myocardium communicating with ventricular cavity, 2 layered structure of endomyocardium leading to LV contractile dysfunction. It is diagnosed echocardiographically.

1018 Left ventricular noncompaction is best related to ?

Harrison's 18th Ed. 1963

- A. Restanin
- B. Tafazzin
- C. Gibazin
- D. Frufin

Diagnostic criteria of left ventricular noncompaction includes presence of multiple trabeculations in left ventricle distal to papillary muscles, creating a "spongy" appearance of apex. It is associated with multiple genetic variants in sarcomeric and other proteins such as tafazzin.

1019 What does "tako tsubo" in Japanese language mean ?

Q J Med 2003; 96:563-573

- A. Japanese baloon
- B. Japanese parachute
- C. Japanese pot for fishing octopus
- D. Japanese fishing net

"Tako-tsubo" in Japanese language refers to a Japanese pot for fishing for octopus.

1020 Which of the following is false about Tako-Tsubo (stress) cardiomyopathy ?

Harrison's 18th Ed. 1964

- A. Also known as apical ballooning syndrome
- B. Severe chest discomfort preceded by stressful emotional or physical event
- C. Occurs mostly in women >50 years
- D. None of the above

Also known as apical ballooning syndrome, Tako-Tsubo (stress) cardiomyopathy is characterized by abrupt & severe chest discomfort preceded by a stressful emotional or physical event. It occurs mostly in women >50 years.

1021 Which of the following is false about Tako-Tsubo (Stress) Cardiomyopathy ?

Harrison's 18th Ed. 1964

- A. ST elevations &/or T-wave inversions in chest leads
- B. Normal coronary angiography
- C. ECG & Echo CG changes revert in 3-7 days
- D. None of the above

ECG in Tako-Tsubo (stress) cardiomyopathy shows ST-segment elevations and/or deep T-wave inversions in chest leads. Coronary angiography shows no obstruction in epicardial arteries. Severe akinesia of distal portion of left ventricle with EF reduction occurs. Troponins are mildly elevated. Changes are reversible in 3 - 7 days without consequences.

Restrictive cardiomyopathy

1022 The hallmark of the late secondary restrictive cardiomyopathies is abnormal ?

Harrison's 17th Ed. 1485

- A. Systolic dysfunction
- B. Diastolic dysfunction
- C. Systolic + diastolic dysfunction
- D. Any of the above

Hallmark of restrictive cardiomyopathies is abnormal diastolic function. Ventricular walls are excessively rigid & impede ventricular filling due to myocardial fibrosis, hypertrophy or infiltration. Infiltrative diseases leading to secondary RCM may show impairment of systolic function.

1023 Which of the following is a feature of restrictive cardiomyopathy ?

Harrison's 18th Ed. 1964

- A. Both atria are enlarged
- B. End-diastolic pressures are elevated in both ventricles
- C. Preserved cardiac output
- D. All of the above

1024 Which of the following is the more common cause of secondary restrictive cardiomyopathy ?

Harrison's 18th Ed. 1964

- A. Amyloidosis
- B. Sarcoidosis
- C. Scleroderma
- D. Hemochromatosis

Myocardial involvement with amyloid is a common cause of secondary RCM, although restriction is also seen in the transplanted heart, in hemochromatosis, glycogen deposition, endomyocardial fibrosis, sarcoidosis, hypereosinophilic disease, and scleroderma, following mediastinal irradiation, and in neoplastic infiltration.

1025 Familial amyloidosis results from an autosomal dominant mutation in ?

Harrison's 18th Ed. 1964

- A. Calcitonin
- B. Gelsolin
- C. Transthyretin
- D. Amyloid β protein

Familial amyloidosis results from an autosomal dominant mutation in transthyretin, a carrier protein for thyroxine and retinol.

1026 Amyloidosis is best related to which of the following ?

Harrison's 18th Ed. 1966, Figure 238-12

- A. Glycosphingolipid
- B. Congo red stain
- C. Mucopolysaccharidoses
- D. Hypereosinophilic syndrome

Congo red stain can be used to highlight amyloid.

1027 Amyloid fibrils infiltrate the myocardium, especially around ?

Harrison's 18th Ed. 1965

- A. Cardiomyocyte
- B. Coronary vessels
- C. Lymphatics
- D. Entry of SVC, IVC

Amyloid fibrils infiltrate myocardium, especially around conduction system & coronary vessels.

1028 Typical feature of amyloidosis is ?

Harrison's 18th Ed. 1965

- A. Conduction block
- B. Autonomic neuropathy
- C. Renal involvement
- D. All of the above

Typical clinical features are conduction block, autonomic neuropathy, renal involvement, and occasionally thickened skin lesions.

1029 2D echocardiogram that shows a thickened myocardial wall with a distinctive "speckled" appearance is suggestive of ?

Harrison's 18th Ed. 1965

- A. Endomyocardial fibrosis
- B. Eosinophilic endomyocardial disease
- C. Primary cardiac amyloidosis
- D. All of the above

2D echocardiogram that shows a thickened myocardial wall with a distinctive "speckled" appearance is suggestive of amyloidosis.

1030 Which of the following go in favour of amyloidosis ?

Harrison's 18th Ed. 1965

- A. Low voltage ECG
- B. Refractile brightness in septum on echocardiography
- C. Both atria are dilated
- D. All of the above

1031 Fabry's disease results from a deficiency of ?

Harrison's 18th Ed. 1965

- A. Alpha-galactosidase A
- B. Beta-galactosidase
- C. Sphingomyelinase
- D. Neuraminidase

Fabry's disease results from a deficiency of the lysosomal enzyme alpha-galactosidase A.

1032 Which of the following about Fabry's disease is false ?

Harrison's 18th Ed. 3191

- A. Autosomal dominant disorder
- B. Disorder of glycosphingolipid metabolism
- C. Leg lymphedema without hypoproteinemia
- D. Enzyme therapy useful

Fabry's disease is an X-linked recessive disorder that may also cause clinical disease in female carriers. Clinically, it manifests with angiokeratomas (telangiectatic skin lesions), hypohidrosis, corneal & lenticular opacities, acroparesthesia; & small-vessel disease of kidney, heart & brain.

1033 Which of the following about angiokeratomas in Fabry's disease is false ?

Harrison's 18th Ed. 3191

- A. Do not blanch with pressure
- B. Mostly between umbilicus & knees "bathing suit area"
- C. Punctate, dark red to blue-black
- D. Asymmetric

Angiokeratomas are punctate, dark red to blue-black, flat or slightly raised, and usually symmetric; they do not blanch with pressure. They range from barely visible to several millimeters in

diameter and have a tendency to increase in size and number with age. They are most dense between umbilicus & knees - the "bathing suit area". Angiokeratomas also occur in Fordyce scrotal angiokeratoma and several other very rare lysosomal storage diseases.

1034 Cardiac Danon's Disease is due to mutations in ?

Harrison's 18th Ed. 1966

- A. LAMP1
- B. LAMP2
- C. LAMP3
- D. LAMP4

Cardiac Danon Disease is caused by mutations in an X-linked lysosome-associated membrane protein (LAMP2).

1035 ECG of which of the following inherited metabolic cardiomyopathies with LVH shows ventricular preexcitation ?

Harrison's 18th Ed. 1966

- A. Fabry Disease
- B. Friedreich's Ataxia
- C. Cardiac Danon Disease
- D. Glycogen Storage Cardiomyopathy

ECG in Cardiac Danon Disease shows severe LV hypertrophy & ventricular preexcitation. Deficiencies of LAMP2 and protein kinase, adenosine monophosphate (AMP)-activated gamma 2 noncatalytic subunit (PRKAG2) result in the accumulation of glycogen in heart and skeletal muscle. Their electrophysiologic abnormalities, particularly ventricular preexcitation and conduction defects distinguish them from patients with hypertrophic cardiomyopathy resulting from defects in sarcomere-protein genes.

1036 Differentiation of constrictive pericarditis from restrictive cardiomyopathies is done by which of the following ?

Harrison's 17th Ed. 1486

- A. Apex impulse
- B. Mitral regurgitation
- C. Pericardial calcification
- D. All of the above

Apex impulse is easily palpable & mitral regurgitation is more common in RCM. Pericardial calcification on Chest x-ray/CT/MRI occurs commonly in constrictive pericarditis.

1037 Endomyocardial fibrosis most commonly affects which of the following age groups ?

Harrison's 16th Ed. 1412

- A. Children and young adults
- B. Middle aged
- C. Elderly
- D. Any of the above

Endomyocardial fibrosis is a progressive disease of unknown cause that occurs mostly in children & young adults residing in tropical & subtropical Africa, particularly Uganda & Nigeria.

1038 Fibrous endocardial lesions in endomyocardial fibrosis involve which of the following areas of heart ?

Harrison's 17th Ed. 1487

- A. Inflow portion of right or left atria (or both)
- B. Outflow portion of right or left atria (or both)
- C. Inflow portion of right or left ventricle (or both)
- D. Outflow portion of right or left ventricle (or both)

Endomyocardial fibrosis is characterized by fibrous endocardial lesions of inflow portion of right or left ventricle (or both) & often involves atrioventricular valves, producing valvular regurgitation.

1039 Endocardial fibrosis results from which of the following ?

Harrison's 17th Ed. 1486

- A. Carcinoid syndrome
- B. Fenfluramine
- C. Phentermine
- D. All of the above

Carcinoid syndrome, use of anorexic agents like fenfluramine & phentermine result in endocardial fibrosis & stenosis and/or regurgitation of the tricuspid and/or pulmonary valve.

Hypertrophic cardiomyopathy (HCM)

1040 In HCM, ubiquitous pathophysiologic abnormality is ?

Harrison's 18th Ed. 1967

- A. Systolic dysfunction
- B. Diastolic dysfunction
- C. Systolic + diastolic dysfunction
- D. None of the above

Ubiquitous pathophysiologic abnormality in HCM is diastolic dysfunction, characterized by increased stiffness of hypertrophied muscle. This results in elevated diastolic filling pressures & is present despite of a hyperdynamic left ventricle.

1041 In HCM, most common mutations occur in which of the following genes ?

Harrison's 18th Ed. 1968

- A. Cardiac alpha-myosin heavy chain gene
- B. Cardiac beta-myosin heavy chain gene
- C. Cardiac myosin light chain gene
- D. Cardiac troponins C, I, and T gene

In HCM, most common are mutations of the cardiac beta-myosin heavy chain gene. Others involve alpha-myosin heavy chains, cardiac troponins C, I, and T, cardiac myosin-binding protein C, actin, myosin light chains & titin.

1042 In HCM, most common mutations of cardiac beta-myosin heavy chain gene is on ?

Harrison's 17th Ed. 1484

- A. Chromosome 10
- B. Chromosome 12
- C. Chromosome 14
- D. Chromosome 16

In HCM, most common mutations of cardiac beta-myosin heavy chain gene is on chromosome 14.

1043 At what age, full genetic expression occurs in first-degree relatives of patients with familial HCM ?

Harrison's 17th Ed. 1484

- A. 5 years
- B. 10 years
- C. 20 years
- D. 30 years

Echocardiographic studies have confirmed that by age 20 years, full genetic expression occurs in about half of the first-degree relatives of patients with familial HCM.

1044 Which of the following is the most common cause of SCD in young competitive athletes ?

Harrison's 18th Ed. 1968

- A. MVP
- B. Long QT syndrome
- C. HCM

- D. Tetralogy of Fallot

HCM is the most common cause of SCD in young competitive athletes.

1045 Which of the following is the most common cause of sudden death among young athletes ?

N Engl J Med 2003;349:1064-75.

- A. Mitral valve prolapse syndrome
- B. Hypertrophic cardiomyopathy
- C. Thyrotoxicosis
- D. Anxiety

Hypertrophic cardiomyopathy is the most common cause of sudden death among young athletes.

1046 What proportion of first-degree relatives of patients with familial HCM have evidence of the disease ?

Harrison's 16th Ed. 1411

- A. One-fourth
- B. One-third
- C. One-half
- D. Three-fourth

Echocardiographic studies have confirmed that about one-third of the first-degree relatives of patients with familial HCM have evidence of disease.

1047 In symptomatic HCM, the most common complaint is ?

Harrison's 18th Ed. 1968

- A. Dyspnea
- B. Palpitation
- C. Angina pectoris
- D. Syncope

In symptomatic HCM patients, most common complaint is dyspnea, due to diastolic ventricular dysfunction which impairs ventricular filling & leads to elevated LV diastolic, left atrial & pulmonary capillary pressures. Other symptoms include syncope, angina pectoris & fatigue. Symptoms are not closely related to the presence or severity of an outflow pressure gradient.

1048 Mendelian transmission of single-gene defects may occur in ?

Harrison's 16th Ed. 1302

- A. Hypertrophic cardiomyopathy
- B. Marfan syndrome
- C. Long QT syndrome
- D. All of the above

Familial clustering due to Mendelian transmission of single-gene defects may occur in hypertrophic cardiomyopathy, Marfan syndrome & sudden death associated with a prolonged QT syndrome. Essential hypertension or coronary atherosclerosis are often polygenic disorders.

1049 Risk of sudden death in HCM correlates with all except ?

Harrison's 18th Ed. 1970

- A. Ventricular tachycardia on ambulatory monitoring
- B. Marked ventricular septal hypertrophy (>30 mm)
- C. Abnormal blood pressure response to exercise
- D. Severity of symptoms

HCM patients at higher risk of sudden death are those with a history of resuscitation from sudden cardiac death, ventricular tachycardia on ambulatory monitoring or at electrophysiologic testing, marked ventricular hypertrophy (ventricular septal thickness >30 mm), syncope (in children), genetic mutations associated with an increased risk, abnormal blood pressure response to exercise & a family history of sudden death. There is no correlation between the risk of sudden death and the severity of symptoms, but there is an increased risk of death in patients with outflow gradients.

1050 Systolic murmur in obstructive HCM is best heard at ?

Harrison's 18th Ed. 1968

- A. A₁ area
- B. A₂ area
- C. Pulmonary area
- D. Lower left sternal border

Hallmark of obstructive HCM is a systolic murmur which is typically harsh, diamond-shaped & begins after S1, since ejection is unimpeded early in systole. Murmur is best heard at lower left sternal border as well as at apex, where it is often more holosystolic & blowing in quality due to mitral regurgitation that usually accompanies obstructive HCM.

1051 Which of the following accompanies obstructive HCM ?

Harrison's 18th Ed. 1968

- A. AS
- B. AR
- C. MS
- D. MR

1052 Maneuvers that increase the murmur of obstructive HCM include all except ?

Harrison's 18th Ed. 1968

- A. Valsalva maneuver
- B. Tachycardia
- C. Sudden standing
- D. Passive leg raising

1053 Maneuvers that decrease the murmur of obstructive HCM include all except ?

Harrison's 18th Ed. 1968

- A. Squatting
- B. Sustained handgrip
- C. Nitroglycerin
- D. Passive leg raising

Interventions that increase myocardial contractility like exercise, sympathomimetic amines & digitalis glycosides, and those that reduce ventricular volume like Valsalva maneuver, sudden standing, nitroglycerin, amyl nitrite or tachycardia, may all cause an increase in the gradient & the murmur. Conversely, elevation of arterial pressure by phenylephrine, squatting, sustained handgrip, augmentation of venous return by passive leg raising & expansion of the blood volume all increase ventricular volume & ameliorate the gradient & murmur.

1054 Left ventricular cavity in HCM is typically ?

Harrison's 18th Ed. 1968

- A. Small
- B. Normal
- C. Large
- D. Any of the above

Left ventricular cavity typically is small in HCM, with vigorous posterior wall motion but reduced septal excursion.

1055 In echocardiography of HCM, interventricular septum is how many times thicker than high posterior left ventricular free wall ?

Harrison's 17th Ed. 1484

- A. 0.5 times
- B. 0.8 times
- C. 1.1 times
- D. 1.3 times

HCM echocardiogram, demonstrates LVH, with septum 1.3 or more times the thickness of high posterior left ventricular free wall.

1056 Which of the following investigation is best for accurate measurements of regional hypertrophy and in identifying sites of regional fibrosis ?

Harrison's 17th Ed. 1484

- A. ECG
- B. Echocardiography
- C. CMRI
- D. LV Angiography

CMRI is superior to echocardiography in providing accurate measurements of regional hypertrophy and in identifying sites of regional fibrosis.

1057 Complications of HCM include ?

N Engl J Med 2004;350:1320-7

- A. Atrial fibrillation
- B. Infective endocarditis
- C. Sudden death
- D. All of the above

Propensity for sudden death in HCM is genetic. Other complications include atrial fibrillation, infective endocarditis & end-stage heart failure.

1058 Which of the following calcium channel blockers should be avoided in cases of obstructive HCM ?

Harrison's 16th Ed. 1411

- A. Verapamil
- B. Diltiazem
- C. Nifedipine
- D. All of the above

Verapamil & diltiazem reduces stiffness of ventricle, reduces elevated diastolic pressures, increase exercise tolerance & reduces severity of outflow tract pressure gradients. Nifedipine should be avoided.

1059 Which of the following drugs should be avoided in cases of obstructive HCM ?

Harrison's 16th Ed. 1411

- A. Digitalis
- B. Diuretics
- C. Nitrates
- D. All of the above

Digitalis, diuretics, nitrates, vasodilators are best avoided, particularly in patients with known left ventricular outflow tract pressure gradients.

1060 Which out of the following drugs should not be used in a case of obstructive HCM ?

N Engl J Med 2004;350:1320-7

- A. Beta-blockers
- B. Digitalis
- C. Nondihydropyridine calcium blockers
- D. Disopyramide

Beta blockers block the effects of catecholamines that exacerbate outflow tract obstruction & to slow the heart rate so that diastolic filling is enhanced. Disopyramide exerts negative inotropic effects that decreases the outflow gradient and thereby improve symptoms. Digitalis increases left ventricular outflow tract pressure gradients by increasing myocardial contractility.

1061 Which of the following drug is protective against SCD in HCM ?

Harrison's 18th Ed. 1969

- A. Amiodarone
- B. Beta-adrenergic blockers

C. Disopyramide

D. Diltiazem

Amiodarone is effective in reducing the frequency of supraventricular as well as life-threatening ventricular arrhythmias and anecdotal data suggest that it may reduce the risk of SCD.

1062 Which of the following is false about HCM ?

Harrison's 17th Ed. 1484-5

- A. Found in ~1 in 500 of general population
- B. Systolic anterior motion of mitral valve is characteristic
- C. Myocardial perfusion defects on thallium 201 radionuclide scintigraphy frequent
- D. None of the above

HCM is found in ~1 in 500 of the general population. Dynamic LV subaortic outflow tract pressure gradient due to midsystolic proximity of anterior mitral valve leaflet against hypertrophied septum is typical of obstructive HCM. Radionuclide scintigraphy with thallium 201 frequently shows myocardial perfusion defects even in asymptomatic patients.

1063 What is meant by "burnt out HCM" ?

Harrison's 18th Ed. 1970

- A. HCM not manifesting in offsprings
- B. HCM disappearing with advancing age
- C. HCM progressing to DCM with disappearance of preexisting outflow pressure gradient
- D. HCM with AR

Progression of HCM to left ventricular dilatation & dysfunction (DCM) with wall thinning & disappearance of a preexisting outflow pressure gradient is called burnt out HCM. It occurs in 5 - 10% of patients & may be associated with nonresponsive CHF requiring cardiac transplantation.

Chapter 239. Pericardial Disease

1064 Pericardial cavity normally contains how much fluid ?

Harrison's 18th Ed. 1971

- A. 5 to 10 ml of fluid
- B. 10 to 20 ml of fluid
- C. 15 to 50 ml of fluid
- D. 50 to 100 ml of fluid

Normal pericardium is a double-layered sac. Visceral pericardium is a serous membrane that is separated by a small quantity (15 to 50 mL) of fluid, an ultrafiltrate of plasma, from the fibrous parietal pericardium.

1065 In partial left pericardial defects, which of the following may bulge through the defect ?

Harrison's 18th Ed. 1971

- A. Aorta
- B. Left atrium
- C. Left ventricle
- D. Pulmonary vein

In partial left pericardial defects, main pulmonary artery & left atrium may bulge through the defect.

1066 Chest pain is often absent in which of the following ?

Harrison's 18th Ed. 1971

- A. Postirradiation pericarditis
- B. Neoplastic pericarditis
- C. Uremic pericarditis
- D. All of the above

Chest pain is absent in slowly developing TB, postirradiation, neoplastic & uremic pericarditis.

1067 Which of the following statements about chest pain of acute pericarditis is false ?

Harrison's 18th Ed. 1971

- A. Retrosternal and left precordial
- B. Exacerbated by inspiration
- C. Worse when the patient sits upright and leans forward and improves in supine position
- D. Pain may radiate to one or both trapezius muscle ridges

Pain of acute pericarditis is often severe, retrosternal & left precordial, referred to neck, arms, or left shoulder. Often pain is pleuritic, aggravated by inspiration, coughing & changes in body position. Pericardial pain is relieved by sitting up & leaning forward & is intensified by lying supine.

1068 Pericardial friction rub is best heard at ?

Harrison's 18th Ed. 1971

- A. Apex
- B. Left lower sternal border
- C. Right sternal border
- D. All of the above

Pericardial friction rub is high-pitched, elicited sometimes only at the left lower sternal border at end-expiration with the patient upright & leaning forward throughout the respiratory cycle.

1069 "Triphasic" pericardial friction rub is heard in about ?

N Engl J Med 2004;351:2195-202

- A. 100% of patients
- B. 75% of patients
- C. 50% of patients
- D. 25% of patients

1070 PR-segment depression is seen in which stage of acute pericarditis ?

Harrison's 18th Ed. 1971

- A. Stage I
- B. Stage II
- C. Stage III
- D. Stage IV

1071 Widespread T-wave inversions are found in which stage of acute pericarditis ?

Harrison's 18th Ed. 1971

- A. Stage I
- B. Stage II
- C. Stage III
- D. Stage IV

ECG in acute pericarditis evolves through 4 stages. In stage 1, there is widespread elevation of ST segments with upward concavity, involving two or three standard limb leads and V_2 to V_6 as well as PR-segment depression with no significant changes in QRS. In stage 2, ST segments return to normal and then T waves become inverted (stage 3). Weeks or months later, ECG returns to normal in stage 4.

1072 In acute pericarditis, reciprocal depression is seen in ?

Harrison's 18th Ed. 1971

- A. aVR
- B. aVL
- C. aVF
- D. All of the above

ECG in stage 1 of acute pericarditis shows widespread elevation of ST segments, with upward concavity, involving two or three standard limb leads and V_2 to V_6 with reciprocal depressions only in aVR and sometimes V_1 , as well as depression of the PR segment below the TP segment reflecting atrial involvement without significant changes in QRS complexes.

1073 The most reliable ECG distinguishing feature between acute pericarditis and acute myocardial infarction is ?

N Engl J Med 2004;351:2195-202, Harrison's 18th Ed. 1971

- A. Ratio of ST segment elevation to T-wave height in V_6 of > 0.16
- B. Ratio of ST segment elevation to T-wave height in V_6 of > 0.20
- C. Ratio of ST segment elevation to T-wave height in V_6 of > 0.24
- D. Ratio of ST segment elevation to T-wave height in V_6 of > 0.28

In early repolarization, T waves are usually tall and the ST/T ratio is < 0.25 , this ratio is higher in acute pericarditis.

1074 Patch of dullness on auscultation beneath angle of left scapula in pericardial effusion is called ?

Harrison's 18th Ed. 1971

- A. Auenbrugger's sign
- B. Ewart's Sign
- C. Broadbent's sign
- D. Ebstein's sign

Patch of dullness on auscultation beneath angle of left scapula due to compressive atelectasis of left lung base by pericardial fluid is called Ewart's Sign (William Ewart, UK). Also known as Bamberger-Pins-Ewart Sign or Pins' Syndrome. Auenbrugger's sign - epigastric prominence seen in marked pericardial effusion. Broadbent's sign - retraction of thoracic wall, synchronous with cardiac systole, visible in left posterior axillary line is a sign of adherent pericardium. Ebstein's sign - obtuseness of the cardiohepatic angle on percussion. Friedreich's sign - In adherent pericardium, sudden collapse of the previously distended veins of neck at each diastole. Rotch's sign - percussion dullness in fifth intercostal space on the right. Heim-Kreysig sign - In adherent pericardium, an indrawing of the intercostal spaces, synchronous with cardiac systole. Synonym: Kreysig's sign.

1075 Which of the following is the name given to the configuration of the cardiac silhouette in pericardial effusion ?

Harrison's 18th Ed. 1971

- A. Hour glass
- B. Water bottle
- C. Dust bin
- D. Tear drop

Chest roentgenogram in pericardial effusion may show a "water bottle" configuration of the cardiac silhouette but may be normal.

1076 Which out of the following is the less common cause of cardiac tamponade ?

Harrison's 18th Ed. 1972

- A. Neoplastic disease
- B. Tuberculosis
- C. Idiopathic pericarditis
- D. Renal failure

3 commonest causes of tamponade are neoplastic disease, idiopathic pericarditis & renal failure.

1077 In cardiac tamponade, Beck's triad consists of all except ?

Harrison's 18th Ed. 1972

- A. Hypotension
- B. Soft or absent heart sounds
- C. Pulsus paradoxus
- D. Jugular venous distention with a prominent "x" descent but an absent "y" descent

Three main features of cardiac tamponade (Beck's triad) are hypotension, soft or absent heart sounds, and jugular venous distention with a prominent "x" descent but an absent "y" descent.

1078 Presence of which of the following should raise suspicion of cardiac tamponade ?

Harrison's 18th Ed. 1972

- A Reduction in amplitude of QRS complexes
- B. Electrical alternans of P wave
- C. Electrical alternans of QRS or T waves
- D. All of the above

1079 In ECG, electrical alternans may be present in ?

Harrison's 18th Ed. 1975, Table 239-2

- A Cardiac tamponade
- B. Constrictive pericarditis
- C. Restrictive cardiomyopathy
- D. RVMI

1080 Kussmaul's sign is absent in which of the following ?

Harrison's 18th Ed. 1975, Table 239-2

- A Cardiac tamponade
- B. Constrictive pericarditis
- C. Restrictive cardiomyopathy
- D. Right ventricular myocardial infarction (RVMI)

When jugular veins are distended and venous pressure fails to decline during inspiration is called Kussmaul's sign. It is absent in cardiac tamponade and is seen in chronic pericarditis, tricuspid stenosis, right ventricular infarction, and restrictive cardiomyopathy.

1081 Right ventricular size is small in which of the following ?

Harrison's 18th Ed. 1975, Table 239-2

- A Cardiac tamponade
- B. Constrictive pericarditis
- C. Restrictive cardiomyopathy
- D. Right ventricular myocardial infarction (RVMI)

1082 On echocardiography, right atrial collapse and right ventricular diastolic collapse (RVDC) is present in which of the following ?

Harrison's 18th Ed. 1975, Table 239-2

- A Cardiac tamponade
- B. Constrictive pericarditis
- C. Restrictive cardiomyopathy
- D. Right ventricular myocardial infarction (RVMI)

1083 Prominent "y" descent is usually present in which of the following condition ?

Harrison's 18th Ed. 1975, Table 239-2

- A Cardiac tamponade
- B. Constrictive pericarditis
- C. Restrictive cardiomyopathy
- D. RVMI

1084 Prominent "x" descent is rare in ?

Harrison's 18th Ed. 1975, Table 239-2

- A Cardiac tamponade
- B. Constrictive pericarditis
- C. Restrictive cardiomyopathy
- D. RVMI

In constrictive pericarditis, right & left atrial pressure pulses display an M-shaped contour, with prominent x and y descents. y descent, which is absent or diminished in cardiac tamponade, is the most prominent deflection in constrictive pericarditis. It reflects rapid early filling of the ventricles. y descent is interrupted by a rapid rise in atrial pressure during early diastole, when ventricular filling is impeded by constricting pericardium. In constrictive pericarditis, ventricular pressure pulses in both ventricles exhibit characteristic "square root" signs during diastole.

1085 Pericardial knock is often present in ?

Harrison's 18th Ed. 1975, Table 239-2

- A Cardiac tamponade
- B. Constrictive pericarditis
- C. Restrictive cardiomyopathy
- D. RVMI

An early third heart sound i.e., a pericardial knock, occurring at the cardiac apex 0.09–0.12 s after aortic valve closure, is often conspicuous in constrictive pericarditis. It is due to an abrupt cessation of ventricular filling.

1086 Pulsus paradoxus is defined as a decrease in systolic arterial pressure of ?

Harrison's 18th Ed. 1972

- A > 10 mm Hg with inspiration
- B. > 20 mm Hg with inspiration
- C. > 30 mm Hg with inspiration
- D. > 40 mm Hg with inspiration

The presence of cardiac tamponade consists of a greater than normal (10 mmHg) inspiratory decline in systolic arterial pressure.

1087 Pulsus paradoxus is most common in ?

Harrison's 18th Ed. 1972

- A Cardiac tamponade
- B. Constrictive pericarditis
- C. Restrictive cardiomyopathy
- D. All of the above

Paradoxical pulse occurs not only in cardiac tamponade but also in approximately one-third of patients with constrictive pericarditis.

1088 Pulsus paradoxus is observed in which of the following condition ?

Harrison's 18th Ed. 1972

- A Hypovolemic shock
- B. Acute and chronic obstructive airways disease
- C. Pulmonary embolus
- D. All of the above

Pulsus paradoxus is not pathognomonic of pericardial disease as it may be observed in some cases of hypovolemic shock, acute & chronic obstructive airways disease & pulmonary embolus.

1089 Doppler ultrasound in cardiac tamponade shows marked increase in flow velocities during inspiration across ?

Harrison's 18th Ed. 1973

- A Pulmonic valve
- B. Pulmonic vein
- C. Mitral valve
- D. Aortic valve

In cardiac tamponade, Doppler ultrasound shows that tricuspid & pulmonic valve flow velocities increase markedly during inspiration, whereas pulmonic vein, mitral & aortic flow velocities diminish.

1090 Most common cause of acute pericarditis is ?

N Engl J Med 2004;351:2195-202

- A Viral or unknown (idiopathic)
- B. Trauma to the chest
- C. Neoplastic invasion of the pericardium
- D. Tuberculosis

1091 Which of the following drugs is not indicated in treatment of idiopathic acute pericarditis ?

Harrison's 16th Ed. 1492

- A. Phenylbutazone
- B. Colchicine
- C. Prednisone
- D. Ibuprofen

If treatment with aspirin is ineffective, colchicine is used. Colchicine may prevent recurrences.

1092 In constrictive pericarditis, right & left atrial pressure pulses display a contour of the shape of ?

Harrison's 18th Ed. 1976

- A. A - shape
- B. M - shape
- C. V - shape
- D. W - shape

In constrictive pericarditis, right & left atrial pressure pulses show M-shaped contour, with prominent x and y descents. The y descent, reflects rapid early filling of ventricles (absent or diminished in cardiac tamponade) is the most prominent deflection in constrictive pericarditis. The y descent is interrupted by a rapid rise in atrial pressure during early diastole, when ventricular filling is impeded by the constricting pericardium.

1093 Broadbent's sign is a feature of ?

Harrison's 18th Ed. 1977

- A. Cardiac tamponade
- B. Constrictive pericarditis
- C. Restrictive cardiomyopathy
- D. RVMl

In chronic constrictive pericarditis, the apical pulse is reduced and may retract in systole - Broadbent's sign.

1094 The possible sequelae of pericarditis include ?

N Engl J Med 2004;351:2195-202

- A. Cardiac tamponade
- B. Recurrent pericarditis
- C. Pericardial constriction
- D. All of the above

1095 The presence of which of the following is most sensitive indicator of cardiac tamponade ?

N Engl J Med 2004;351:2195-202

- A. Systemic arterial hypotension
- B. Tachycardia
- C. Elevated jugular venous pressure
- D. Pulsus paradoxus

1096 The appearance of cardiomegaly on chest radiography indicates a pericardial effusion of ?

N Engl J Med 2004;351:2195-202

- A. > 150 ml
- B. > 250 ml
- C. > 350 ml
- D. > 450 ml

1097 Drugs implicated in the causation of pericarditis include ?

N Engl J Med 2004;351:2195-202

- A. Dantrolene

- B. Doxorubicin
- C. Hydralazine
- D. All of the above

1098 Drugs implicated in the causation of pericarditis include ?

N Engl J Med 2004;351:2195-202

- A. Isoniazid
- B. Methysergide
- C. Pergolide
- D. All of the above

1099 Drugs implicated in the causation of pericarditis include ?

N Engl J Med 2004;351:2195-202

- A. Phenylbutazone
- B. Phenytoin
- C. Procainamide
- D. All of the above

1100 Drugs implicated in the causation of pericarditis include ?

Harrison's 16th Ed. 1493

- A. Isoniazid
- B. Cromolyn
- C. Minoxidil
- D. All of the above

1101 Plasma troponin concentrations are elevated in what percent of patients with pericarditis ?

N Engl J Med 2004;351:2195-202

- A. 10 to 15 percent
- B. 20 to 25 percent
- C. 35 to 50 percent
- D. 50 to 60 percent

1102 A large pericardial effusion is diagnosed if the echo-free space on 2D echocardiography is ?

N Engl J Med 2004;351:2195-202

- A. > 10 mm
- B. > 20 mm
- C. > 30 mm
- D. > 40 mm

1103 In rheumatoid arthritis, pericardial fluid has which of the following features ?

Harrison's 16th Ed. 1424

- A. Exudate
- B. Decreased concentrations of complement and glucose
- C. Elevated cholesterol
- D. All of the above

1104 Interferon alpha is reported to be beneficial in pericarditis caused by ?

Harrison's 16th Ed. 1492

- A. Cytomegalovirus
- B. Coxsackie B
- C. Adenovirus
- D. Parvovirus

1105 Hyperimmune globulin is reported to be beneficial in pericarditis caused by ?

Harrison's 16th Ed. 1492

- A. Cytomegalovirus
- B. Adenovirus
- C. Parvovirus
- D. All of the above

Hyperimmune globulin is beneficial in cytomegalovirus, adenovirus & parvovirus pericarditis, while interferon alpha has been reported to be so in coxsackie B pericarditis.

Chapter 240. Tumors and Trauma of the Heart

1106 Which of the following is the most common primary tumor of heart in adults ?

Harrison's 18th Ed. 1979

- A. Myxoma
- B. Rhabdomyoma
- C. Fibroma
- D. Hemangioma

Myxomas are the most common type of primary cardiac tumor in all age groups, most commonly in third to sixth decade, with a female predilection.

1107 Carney syndrome is characterized by all except ?

Harrison's 18th Ed. 1979

- A. Spotty skin pigmentation
- B. Myxomas
- C. Cataract
- D. Pituitary adenomas

Carney complex comprises of myxomas (cardiac, skin, and/or breast), lentigines and/or pigmented nevi and endocrine overactivity (primary nodular adrenal cortical disease with or without Cushing's syndrome, testicular tumors, and/or pituitary adenomas with gigantism or acromegaly).

1108 NAME syndrome includes all except ?

Harrison's 18th Ed. 1979

- A. Nevi
- B. Atrial myxoma
- C. Myxoedema
- D. Ephelides

NAME syndrome consists of nevi, atrial myxoma, myxoid neurofibroma and ephelides.

1109 LAMB syndrome includes all except ?

Harrison's 18th Ed. 1979

- A. Lentigines
- B. Atrial myxoma
- C. Melanoma
- D. Blue nevi

LAMB syndrome consists of lentigines, atrial myxoma and blue nevi.

1110 Most common tumor of the cardiac valves is ?

Harrison's 18th Ed. 1980

- A. Lipoma
- B. Papillary fibroelastoma
- C. Sarcoma

D. Cardiac metastases

Papillary fibroelastomas are the most common tumors of the cardiac valves.

1111 Which of the following is the most common primary tumor of heart in adults ?

Harrison's 18th Ed. 1980

- A. Lipoma
- B. Myocytic hamartoma
- C. Myxoma
- D. Inflammatory psuedotumor

1112 Which of the following is the most common primary tumor of heart in children ?

Harrison's 18th Ed. 1980

- A. Myxoma
- B. Rhabdomyoma
- C. Lipoma
- D. Hemangioma

Rhabdomyomas and fibromas are the most common cardiac tumors in infants and children and usually occur in ventricles. Rhabdomyomas are strongly associated with tuberous sclerosis.

1113 Which of the following heart tumour is intramyocardial in location ?

Harrison's 18th Ed. 1980

- A. Myxoma
- B. Rhabdomyoma
- C. Lipoma
- D. Hemangioma

Hemangiomas and mesotheliomas most often are intramyocardial in location, and may cause atrioventricular (AV) conduction disturbances.

1114 Relative incidence of cardiac metastases is highest in which of the following malignancies ?

Harrison's 18th Ed. 1981

- A. Leukemia
- B. Lymphoma
- C. Malignant melanoma
- D. None of the above

Relative incidence of cardiac metastases is high in malignant melanoma.

1115 Most common primary originating site of cardiac metastases is ?

Harrison's 18th Ed. 1981

- A. Carcinoma breast
- B. Carcinoma thyroid
- C. Carcinoma pancreas
- D. Carcinoma testes

Most common primary originating sites of cardiac metastases are carcinoma of breast & lung.

1116 In cardiac metastases, which of the following is least involved ?

Harrison's 18th Ed. 1981

- A. Pericardium
- B. Myocardium
- C. Endocardium
- D. All of the above

Cardiac metastases occur via hematogenous or lymphangitic spread or by direct tumor invasion. pericardium is most often involved, followed by myocardial and rarely by involvement of endocardium or cardiac valves.

1117 Which of the following investigation is most useful in diagnostic evaluation of cardiac metastases & cardiac tumors ?

Harrison's 18th Ed. 1981

- A. Echocardiography
- B. CT
- C. Cardiac MRI
- D. Angiography

Cardiac MRI plays a central role in diagnostic evaluation of cardiac metastases & cardiac tumors.

1118 Characteristic endocardial lesions of SLE (Libman & Sacks) are most often located at ?

Harrison's 16th Ed. 1424

- A. Atria
- B. Ventricular surface of mitral valve
- C. Left ventricular outflow tract
- D. Right ventricular outflow tract

1119 What is meant by "commotio cordis" ?

Harrison's 18th Ed. 1981

- A. Impact to chest wall overlying heart
- B. Torsion injury of heart
- C. Kinking of coronary artery
- D. Aneurysmal rupture of coronary artery

Blunt, nonpenetrating injuries to chest that trigger ventricular fibrillation is referred to as commotio cordis. Impact to chest wall overlying heart during the susceptible phase of repolarization just prior to peak of T wave is the cause. Prompt defibrillation saves life.

1120 Which of the following is false about Tako-Tsubo syndrome ?

Harrison's 18th Ed. 1982

- A. Sudden emotional trauma
- B. Hyperdynamic function at ventricular base
- C. Anterior ST-segment elevation
- D. None of the above

Tako-Tsubo syndrome or apical ballooning syndrome is due to sudden emotional or physiologic trauma leading to dysfunction of mid-portion & apex of LV with hyperdynamic function at ventricular base. More common in women, it presents with chest pain, anterior ST-segment elevation & mildly elevated cardiac enzymes without significant epicardial coronary artery disease. Prognosis is favorable & complete & spontaneous resolution of ventricular dysfunction occurs within weeks.

1121 Which of the following is the most common vascular deceleration injury ?

Harrison's 18th Ed. 1982

- A. Post-pericardiotomy syndrome
- B. Tako-Tsubo syndrome
- C. Commotio cordis
- D. Rupture of the aorta

Rupture of aorta, usually just above aortic valve or at the site of ligamentum arteriosum, is the most common vascular deceleration injury with clinical presentation similar to that of aortic dissection.

Chapter 241. The Pathogenesis, Prevention, and Treatment of Atherosclerosis

1122 Stenoses due to atherosclerosis occurs focally in which of the following locations ?

Harrison's 18th Ed. 1983

- A. Proximal left anterior descending coronary artery
- B. Proximal portions of the renal arteries
- C. Carotid bifurcation
- D. All of the above

1123 Which of the following represents the initial lesion of atherosclerosis ?

Harrison's 18th Ed. 1983

- A. Necrotic core
- B. Fatty streak
- C. Microscopic breaches in endothelial integrity
- D. Microthrombi rich in platelets

In human atherosclerosis, "fatty streak" represents the initial lesion of atherosclerosis. These arise from focal increases in the content of lipoproteins within regions of the intima. Fatty streak formation begins beneath a morphologically intact endothelium.

1124 Which of the following slows the egress of lipid-rich particles from the arterial wall intima ?

Harrison's 18th Ed. 1983

- A. Glycosaminoglycans
- B. Flavonoids
- C. Vitamin K
- D. All of the above

Lipoproteins collect and stay in the arterial wall intima by binding to constituents of extracellular matrix. Lipoproteins when associated with glycosaminoglycans of arterial extracellular matrix lead to their slow from the intima. These lipoprotein particles undergo further oxidative modifications and play a pathogenic role in atherogenesis.

1125 Oxidative modification of lipoproteins in the extracellular space of the intima give rise to ?

Harrison's 18th Ed. 1983

- A. Hydroperoxides
- B. Lysophospholipids
- C. Oxysterols
- D. All of the above

Oxidative modification of lipoproteins in the extracellular space of the intima give rise to hydroperoxides, lysophospholipids, oxysterols, and aldehydic breakdown products of fatty acids and phospholipids.

1126 Which of the following reactions modifies high-density lipoprotein (HDL) particles to become poor cholesterol acceptors ?

Harrison's 18th Ed. 1983

- A. Glutathione peroxidase
- B. Hypochlorous acid mediated chlorination
- C. Carnitine biosynthesis
- D. All of the above

High-density lipoprotein (HDL) particles modified by Hypochlorous acid (HOCl)-mediated chlorination function poorly as cholesterol acceptors. This links oxidative stress with impaired reverse cholesterol transport as a likely mechanism of the antiatherogenic action of HDL.

1127 Hypochlorous acid is produced in extracellular space of the intima of arteries by ?

Harrison's 18th Ed. 1983

- A. Pyruvate α -ketoglutarate
- B. Succinic acid dehydrogenase
- C. Monoamine oxidase
- D. Myeloperoxidase

Local production of hypochlorous acid by myeloperoxidase associated with inflammatory cells within the plaque yields chlorinated species such as chlorotyrosyl moieties.

1128 Which of the following leads to the formation of proinflammatory lipids ?

Harrison's 18th Ed. 1983

- A. Ubiquinone
- B. Idebenone
- C. Lipoprotein-associated phospholipase A₂ (LpPL A₂)
- D. All of the above

Member of phospholipase family, lipoprotein-associated phospholipase A₂ (LpPL A₂) can generate proinflammatory lipids, including lysophosphatidyl choline-bearing oxidized lipid moieties from oxidized phospholipids found in oxidized low-density lipoproteins (LDLs).

1129 Which of the following is an endogenous antioxidant ?

Harrison's 18th Ed. 1984

- A. Thioredoxin
- B. Biotin
- C. Retinaldehyde
- D. All of the above

Exposure of endothelial cells to laminar shear stress increases the transcription of Krüppel-like factor 2 (KLF2) and reduces the expression of a thioredoxin-interacting protein (Txnip) that inhibits the activity of the endogenous antioxidant thioredoxin. KLF2 augments the activity of endothelial nitric oxide synthase, and reduced Txnip levels boost the function of thioredoxin.

1130 Atherosclerotic plaques contain which of the following ?

Harrison's 18th Ed. 1985

- A. Fibrin
- B. Hemosiderin
- C. Calcium
- D. All of the above

Atherosclerotic plaques often contain fibrin and hemosiderin, an indication that episodes of intraplaque hemorrhage contribute to plaque complications. As they advance, atherosclerotic plaques also accumulate calcium.

1131 Which of the following proteins found in bone also localize in atherosclerotic lesions ?

Harrison's 18th Ed. 1985

- A. Osteocalcin
- B. Osteopontin
- C. Bone morphogenetic proteins
- D. All of the above

Proteins like osteocalcin, osteopontin, and bone morphogenetic proteins that are usually found in bone also localize in atherosclerotic lesions.

1132 Which of the following contribute to atheromata lesion formation ?

Harrison's 18th Ed. 1985

- A. Extracellular matrix production
- B. Calcification
- C. Neovascularization
- D. All of the above

During the evolution of atherosclerotic plaque, a complex balance between entry and egress of lipoproteins and leukocytes, cell proliferation and cell death, extracellular matrix production, and remodeling, as well as calcification and neovascularization, contribute to lesion formation.

1133 Growing atheroma does not encroach on arterial lumen until the burden of atherosclerotic plaque exceeds ?

Harrison's 18th Ed. 1986

- A. ~ 20 %

- B. ~ 40 %
- C. ~ 60 %
- D. ~ 80 %

During initial phases of atheroma development, plaque usually grows outward, in an abluminal direction leading to increase in diameter of the vessel. This type of vascular remodeling is called compensatory enlargement. Growing atheroma does not encroach on arterial lumen until the burden of atherosclerotic plaque exceeds ~40% of the area encompassed by the internal elastic lamina.

1134 Which of the following is a characteristic feature of the culprit lesion that causes acute MI ?

Harrison's 18th Ed. 1986

- A. Thin fibrous caps
- B. Relatively large lipid cores
- C. High content of macrophages
- D. All of the above

Characteristic features of the culprit lesion that causes acute MI include thin fibrous caps, relatively large lipid cores, and a high content of macrophages. Macrophages & T lymphocytes having markers of inflammatory activation predominate and contain relatively few smooth muscle cells at sites of plaque rupture.

1135 Current ATP III guidelines recommend lipid screening in all adults above ?

Harrison's 18th Ed. 1987

- A. 10 years of age
- B. 20 years of age
- C. 30 years of age
- D. 40 years of age

Current ATP III guidelines recommend lipid screening in all adults >20 years of age and should include a fasting lipid profile (total cholesterol, triglycerides, LDL cholesterol, and HDL cholesterol) repeated every 5 years.

1136 Which of the following is a Niemann-Pick C1-like 1 protein (NPC1L1) inhibitor ?

Harrison's 18th Ed. 1988

- A. Aminophylline
- B. Ezetimibe
- C. Nicotinic acid
- D. Sildenafil

Ezetimibe is a LDL-lowering medication that reduces cholesterol absorption from proximal small bowel by inhibiting an enterocyte cholesterol transporter denoted Niemann-Pick C1-like 1 protein (NPC1L1).

1137 Blood HDL levels vary inversely with those of ?

Harrison's 18th Ed. 1989

- A. Cholesterol
- B. LDL
- C. Triglycerides
- D. VLDL

Blood HDL levels vary inversely with those of triglycerides.

1138 Which of the following can raise HDL levels ?

Harrison's 18th Ed. 1989

- A. Physical activity
- B. Nicotinic acid
- C. Weight loss
- D. All of the above

Weight loss and physical activity can raise HDL. Nicotinic acid, particularly in combination with statins, can robustly raise HDL.

1139 Lipoproteins are essential for the transport of ?*Harrison's 18th Ed. 3145*

- A. Cholesterol
- B. Triglycerides
- C. Fat-soluble vitamins
- D. All of the above

Lipoproteins are complexes of lipids & proteins essential for transport of cholesterol, triglycerides, and fat-soluble vitamins.

1140 Lipoproteins transport hydrophobic lipids through which of the following ?*Harrison's 18th Ed. 3145*

- A. Plasma
- B. Interstitial fluid
- C. Lymph
- D. All of the above

Lipoproteins transport hydrophobic lipids (triglycerides, cholesterol & fat-soluble vitamins) through body fluids (plasma, interstitial fluid & lymph) to & from tissues.

1141 Lipoproteins are essential in the absorption of ?*Harrison's 18th Ed. 3145*

- A. Dietary cholesterol
- B. Long-chain fatty acids
- C. Fat-soluble vitamins
- D. All of the above

Lipoproteins are essential in the absorption of dietary cholesterol, long-chain fatty acids, and fat-soluble vitamins in the proximal small intestine.

1142 Lipoproteins are essential for the transport of which of the following to and from liver to peripheral tissues ?*Harrison's 18th Ed. 3145*

- A. Triglycerides
- B. Cholesterol
- C. Fat-soluble vitamins
- D. All of the above

Lipoproteins are essential for transport of triglycerides, cholesterol & fat-soluble vitamins from liver to peripheral tissues and transport of cholesterol from peripheral tissues to liver.

1143 Which of the following is not a hydrophobic lipid ?*Harrison's 18th Ed. 3145*

- A. Triglycerides
- B. Unesterified cholesterol
- C. Cholesteryl esters
- D. All of the above

Lipoproteins contain a core of hydrophobic lipids (triglycerides & cholesteryl esters) surrounded by hydrophilic lipids (phospholipids, unesterified cholesterol) and proteins.

1144 Major lipid of lipoproteins is ?*Harrison's 18th Ed. 3146, Table 356-1*

- A. Cholesterol
- B. Triglycerides
- C. Phospholipids
- D. All of the above

All lipoprotein classes contain phospholipids, esterified & unesterified cholesterol & triglycerides.

1145 Lipoproteins have been classified on the basis of their ?*Harrison's 18th Ed. 3145, Figure 356-1*

- A. Density
- B. Volume
- C. Diameter
- D. Cell membrane configuration

Lipoproteins are classified by density and size, which are inversely related.

1146 Which of the following is a Lipoprotein ?*Harrison's 18th Ed. 3146, Table 356-1*

- A. Chylomicrons
- B. Very low density lipoproteins (VLDL)
- C. Low-density lipoproteins (LDL)
- D. All of the above

Five major classes of plasma lipoproteins are chylomicrons, very low density lipoproteins (VLDLs), intermediate-density lipoproteins (IDLs), low-density lipoproteins (LDLs), and high-density lipoproteins (HDLs).

1147 Major apolipoprotein of VLDL, IDL, and LDL is ?*Harrison's 18th Ed. 3146, Table 356-1*

- A. Apo B100
- B. Apo B48
- C. Apo E
- D. Apo AI

1148 Apolipoprotein that is essential for assembly & secretion of chylomicrons is ?*Harrison's 18th Ed. 3145*

- A. Apo B100
- B. Apo B48
- C. Apo E
- D. Apo AI

ApoB is the major structural protein of chylomicrons, VLDLs, IDLs, & LDLs - apoB-48 in chylomicron and apoB-100 in VLDL, IDL & LDL.

1149 Apolipoprotein that is essential for assembly & secretion of VLDL from liver is ?*Harrison's 18th Ed. 3147*

- A. Apo B100
- B. Apo B48
- C. Apo E
- D. Apo AI

Liver synthesizes apoB-100 and the intestine makes apoB-48.

1150 Apolipoprotein that is essential activator of enzyme lipoprotein lipase (LPL) is ?*Harrison's 18th Ed. 3146*

- A. Apo B100
- B. Apo B48
- C. Apo E
- D. Apo CII

Triglycerides of chylomicrons are hydrolyzed by LPL & free fatty acids are released. ApoC-II, which is transferred to circulating chylomicrons from HDL, acts as a cofactor for LPL.

1151 Apo E is synthesized mainly in hepatocytes and also in ?*Harrison's 16th Ed. 370*

- A. Macrophages
- B. Neurons
- C. Glial cells
- D. All of the above

1152 Which of the following Apo A is synthesized only in small intestine ?

Harrison's 16th Ed. 2288

- A. apo AI
- B. apo AII
- C. apo AIV
- D. All of the above

1153 apo AI, apo AII and apo AIV are found primarily on ?

Harrison's 18th Ed. 3146, Table 356-2

- A. HDL
- B. LDL
- C. VLDL
- D. IDL

1154 Enzyme lecithin:cholesterol acyltransferase (LCAT) which esterifies free cholesterol in plasma is activated by ?

Harrison's 16th Ed. 2288

- A. Apo AI
- B. Apo AII
- C. Apo AIV
- D. None of the above

1155 Which of the following enzymes are involved in lipoprotein metabolism ?

Harrison's 18th Ed. 3146

- A. Lipoprotein lipase (LPL)
- B. Hepatic triglyceride lipase (HTGL)
- C. Cholesteryl ester transfer protein (CETP)
- D. All of the above

1156 Cholesteryl ester transfer protein (CETP) circulates in plasma in association with ?

Harrison's 18th Ed. 3147

- A. HDL
- B. LDL
- C. VLDL
- D. Chylomicrons

1157 Normolipidemic individuals dispose of most dietary fat in the bloodstream within ?

Harrison's 16th Ed. 2287

- A. 2 hours of the last meal
- B. 4 hours of the last meal
- C. 6 hours of the last meal
- D. 12 hours of the last meal

1158 The surface coat of the chylomicron is composed of ?

Harrison's 18th Ed. 3146

- A. Phospholipid
- B. Free cholesterol
- C. apo B48, apo AI, apo AII, and apo AIV

- D. All of the above

Longer-chain fatty acids (>12 carbons) are incorporated into triglycerides & packaged with apoB-48, cholesteryl esters, retinyl esters, phospholipids and cholesterol to form chylomicrons.

1159 In plasma, apo C proteins are transferred to chylomicron from which lipoprotein ?

Harrison's 16th Ed. 2289

- A. HDL
- B. LDL
- C. VLDL
- D. IDL

1160 The crucial structural apoprotein for HDL is ?

Harrison's 18th Ed. 3146

- A. Apo AI
- B. Apo B48
- C. Apo B100
- D. Apo E

ApoA-I, which is synthesized in liver & intestine, is found on virtually all HDL particles. ApoA-II is the second most abundant HDL apolipoprotein & is on about two-thirds of all HDL particles.

1161 Which of the following represents the initial lesion of atherosclerosis ?

- A. Fibrous plaque
- B. Intimal thickening
- C. Fatty streak
- D. Any of the above

Studies of human atherosclerosis suggests that the "fatty streak" represents the initial lesion of atherosclerosis.

1162 Among oral hypoglycemic agents, which of the following has the best evidence base for cardiovascular event reduction ?

Harrison's 17th Ed. 1507

- A. Metformin
- B. Sulfonyurea
- C. Pioglitazone
- D. Acarbose

Among the oral hypoglycemic agents, metformin possesses the best evidence base for cardiovascular event reduction.

1163 In diabetic populations, American Diabetes Association recommends a blood pressure goal of ?

Harrison's 17th Ed. 1507

- A. 120/70 mmHg
- B. 130/70 mmHg
- C. 120/80 mmHg
- D. 130/80 mmHg

Recently updated American Diabetes Association blood pressure goal is 130/80 mmHg in diabetic populations.

1164 Fredrickson classification is used to classify ?

Harrison's 18th Ed. 3148

- A. Hyperlipoproteinemia
- B. Bile acids
- C. Obesity
- D. Apolipoproteins

1165 Which of the following hyperlipidemias is not characterized by elevated triglycerides ?

Harrison's 18th Ed. 3148, Table 356-3

- A. Type I
- B. Type IIa
- C. Type IIb
- D. Type III

According to Fredrickson classification, type IIa hyperlipidemia does not have hypertriglyceridemia. Types I, IIb, III, IV & V are characterized by elevated triglycerides.

1166 Which of the following Type I hyperlipidemia does not increase risk for developing coronary artery disease ?

Harrison's 18th Ed. 3148, Table 356-3

- A. Type I
- B. Type IIa
- C. Type IIb
- D. Type III

Type I is the only form of hypertriglyceridemia that does not confer an increased risk for developing coronary artery disease.

1167 Type III hyperlipidemia is also known as ?

Harrison's 18th Ed. 3148

- A. Dysbetalipoproteinemia
- B. Remnant removal disease
- C. Broad-beta disease
- D. All of the above

Type III is also known as dysbetalipoproteinemia, remnant removal disease, or broad-beta disease.

1168 Type IV hyperlipidemia is characterized by ?

Harrison's 18th Ed. 3148, Table 356-3

- A. Elevations of VLDL
- B. Elevations of triglycerides
- C. Normal serum cholesterol
- D. All of the above

Type IV is characterized by abnormal elevations of VLDL, and triglyceride levels are almost always >1000 mg/dL. Serum cholesterol levels are normal.

1169 When triglyceride levels >1000 mg/dL, most likely cause is ?

Harrison's 18th Ed. 3149

- A. Type II hyperlipidemia
- B. Type III hyperlipidemia
- C. Type IV hyperlipidemia
- D. Type V hyperlipidemia

When triglyceride levels >1000 mg/dL, most likely cause is type V hyperlipidemia.

1170 Triglyceride content is least in which of the following ?

Harrison's 18th Ed. 3149

- A. Chylomicrons
- B. LDL
- C. VLDL
- D. IDL

By dry weight, triglycerides comprise ~86%, 55%, & 23% of chylomicrons, VLDLs, and IDLs, respectively. Tg is present in LDL & HDL in smaller quantities of <10%.

1171 Conditions that cause hyperlipidemia are all except ?

Harrison's 18th Ed. 3151

- A. Obesity
- B. Diabetes mellitus
- C. Hypothyroidism
- D. Pheochromocytoma

1172 Conditions that cause hyperlipidemia are all except ?

Harrison's 18th Ed. 3150

- A. Nephrotic syndrome
- B. Alcohol ingestion
- C. Oral progesterone
- D. Oral estrogen

1173 Drug that causes hyperlipidemia include ?

Harrison's 16th Ed. 2294

- A. Isotretinoin
- B. Sertraline hydrochloride
- C. Human immunodeficiency virus protease inhibitors
- D. All of the above

1174 Drug that causes hyperlipidemia include ?

Harrison's 16th Ed. 2294

- A. Beta-adrenergic antagonists
- B. Thiazide diuretics
- C. Cyclosporine
- D. All of the above

1175 To convert the values for LDL cholesterol to millimoles per liter, multiply by ?

- A. 0.05863
- B. 0.08651
- C. 0.02586
- D. 0.02861

1176 What is not true for Lipoprotein (a) ?

Harrison's 18th Ed. 3147

- A. Consists of apo B-100 and apo (a)
- B. It is a spherical particle of 250 Å diameter
- C. It closely resembles HDL
- D. Lp(a) has proatherosclerotic and prothrombotic actions

1177 Surface-bound von Willebrand factor binds to ?

Harrison's 16th Ed. 337

- A. GPIb located on circulating platelets
- B. GPIIb located on circulating platelets
- C. GPIIb located on circulating platelets
- D. GPIVb located on circulating platelets

1178 Which of the following are essential to increase the cell-to-cell contact and facilitate platelet aggregation ?

Harrison's 16th Ed. 337

- A. Fibrinogen
- B. Fibronectin
- C. GPI-IX
- D. All of the above

1179 Platelet aggregation and further activation is done by ?

Harrison's 16th Ed. 676

- A. ADP
- B. Adrenaline
- C. Thromboxane A₂
- D. All of the above

1180 The major hepatic isoenzyme involved in simvastatin / atorvastatin metabolism is ?

Harrison's 16th Ed. 16

- A. CYP 2C9
- B. CYP 2C19
- C. CYP 2D6
- D. CYP 3A

1181 The major hepatic isoenzyme involved in nifedipine metabolism is ?

Harrison's 16th Ed. 16

- A. CYP 2C9
- B. CYP 2C19
- C. CYP 2D6
- D. CYP 3A

1182 Major hepatic isoenzyme involved in lidocaine metabolism is ?

Harrison's 16th Ed. 16

- A. CYP 2C9
- B. CYP 2C19
- C. CYP 2D6
- D. CYP 3A

1183 The major hepatic isoenzyme involved in quinidine metabolism is ?

Harrison's 16th Ed. 16

- A. CYP 2C9
- B. CYP 2C19
- C. CYP 2D6
- D. CYP 3A

1184 CYP enzyme activity inducers lower plasma levels of which of the following drugs ?

Harrison's 16th Ed. 16

- A. Warfarin
- B. Quinidine
- C. Mexiletine
- D. All of the above

1185 Heparin cofactor is also called ?

Harrison's 16th Ed. 340

- A. Protein C
- B. Protein S
- C. Antithrombin III
- D. APLA

1186 Which component of red wine has anti-inflammatory and antioxidant properties ?

Lancet 2004;364:985-996

- A. Tyrosine

B. Phenolic

C. Methyl

D. Phenyl

1187 Angiotensin I is converted by angiotensin-converting enzyme to angiotensin II mainly in ?

Harrison's 16th Ed. 2131

- A. Kidney
- B. Liver
- C. Lung
- D. Heart

1188 Which of the following is a 'heptapeptide' ?

Harrison's 16th Ed. 2130

- A. Angiotensinogen
- B. Angiotensin I
- C. Angiotensin II
- D. Angiotensin III

Chapter 242. The Metabolic Syndrome

1189 The metabolic syndrome is also called ?

Harrison's 18th Ed. 1992

- A. Syndrome M
- B. Syndrome X
- C. Syndrome Y
- D. Syndrome Z

The metabolic syndrome is also called syndrome X or insulin resistance syndrome.

1190 Metabolic syndrome increases the risk of ?

Harrison's 18th Ed. 1992

- A. Hypertension
- B. Diabetes mellitus
- C. Stroke
- D. All of the above

Metabolic syndrome consists of a constellation of metabolic abnormalities that confer increased risk of cardiovascular disease (CVD) and diabetes mellitus (DM).

1191 Major features of metabolic syndrome include all except ?

Harrison's 18th Ed. 1992

- A. Central obesity
- B. Hypertriglyceridemia
- C. High low-density lipoprotein (LDL) cholesterol
- D. Low high-density lipoprotein (HDL) cholesterol

Five major features of the metabolic syndrome include central obesity, hypertriglyceridemia, low high-density lipoprotein (HDL) cholesterol, hyperglycemia, and hypertension.

1192 Which of the following about metabolic syndrome is false ?

Harrison's 18th Ed. 1992

- A. Prevalence increases with age
- B. Increases in waist circumference predominate in women
- C. Fasting triglycerides >150 mg/dL more likely in women
- D. Hypertension more likely in men

In metabolic syndrome, increases in waist circumference predominate in women, whereas fasting triglycerides >150 mg/dL and hypertension are more likely in men.

1193 Lipodystrophic disorder associated with the metabolic syndrome is ?

Harrison's 18th Ed. 1993

- A. Berardinelli-Seip congenital lipodystrophy
- B. Dunnigan familial partial lipodystrophy
- C. HIV-related lipodystrophy in patients on HAART
- D. All of the above

1194 Which of the following is central to the development of insulin resistance ?

Harrison's 18th Ed. 1993

- A. Postprandial hyperinsulinemia
- B. Fasting hyperinsulinemia
- C. Hyperglycemia
- D. Overabundance of circulating fatty acids

An early major contributor to the development of insulin resistance is an overabundance of circulating fatty acids. Onset of insulin resistance is heralded by postprandial hyperinsulinemia, followed by fasting hyperinsulinemia and, ultimately, hyperglycemia.

1195 Which of the statements is false ?

Harrison's 18th Ed. 1993

- A. Insulin inhibits lipolysis in adipose tissue
- B. Insulin stimulates lipoprotein lipase (LPL) in adipose tissue
- C. Lipolysis produces fatty acids
- D. None of the above

1196 In the liver, free fatty acids (FFAs) result in ?

Harrison's 18th Ed. 1994, Figure 242-2

- A. Increased production of glucose
- B. Increased production of triglycerides
- C. Increased secretion of very low density lipoprotein (VLDL)
- D. All of the above

In metabolic syndrome, free fatty acids (FFAs) are released in abundance from an expanded adipose tissue mass. In liver, FFAs result in an increased production of glucose and triglycerides and secretion of very low density lipoproteins (VLDLs).

1197 C-reactive protein (CRP) is produced in ?

Harrison's 18th Ed. 1994, Figure 242-2

- A. Liver
- B. Kidney
- C. Pancreas
- D. Lung

C-reactive protein (CRP) is produced in liver.

1198 Which of the following is an anti-inflammatory and insulin-sensitizing cytokine ?

Harrison's 18th Ed. 1994, Figure 242-2

- A. Interleukin 6 (IL-6)
- B. Resistin
- C. Adiponectin
- D. C-reactive protein (CRP)

Adiponectin is an anti-inflammatory cytokine produced exclusively by adipocytes. Reduced production of this insulin-sensitizing cytokine adiponectin is associated with the metabolic syndrome.

1199 There is almost always a predominance of small dense LDLs when fasting serum triglyceride is ?

Harrison's 18th Ed. 1994

- A. ~ 100 mg/dL
- B. ~ 130 mg/dL
- C. ~ 150 mg/dL
- D. ~ 180 mg/dL

There is almost always a predominance of more atherogenic small dense LDLs when fasting serum triglyceride is ~180 mg/dL. Small dense LDLs are toxic to endothelium and are able to pass through endothelial basement membrane & adhere to glycosaminoglycans.

1200 In the setting of insulin resistance, which of the following effect of insulin is lost ?

Harrison's 18th Ed. 1994

- A. Increased activity of sympathetic nervous system
- B. Sodium reabsorption in kidney
- C. Vasodilatory
- D. All of the above

Under normal physiologic conditions, insulin is a vasodilator with secondary effects on sodium reabsorption in the kidney. In insulin resistance, vasodilatory effect of insulin is lost but the renal effect on sodium reabsorption is preserved. Insulin induced increases the activity of sympathetic nervous system is preserved in insulin resistance.

1201 Which of the following is a proinflammatory cytokine ?

Harrison's 18th Ed. 1995

- A. IL-18
- B. Resistin
- C. C-reactive protein (CRP)
- D. All of the above

Proinflammatory cytokines include interleukin (IL)-1, IL-6, IL-18, resistin, tumor necrosis factor- α (TNF- α), and C-reactive protein (CRP).

1202 Levels of which of the following is reduced in the metabolic syndrome ?

Harrison's 18th Ed. 1995

- A. Adiponectin
- B. Resistin
- C. C-reactive protein (CRP)
- D. Interleukin-18

Adiponectin is an anti-inflammatory cytokine that enhances insulin sensitivity. It is produced exclusively by adipocytes. In liver, it inhibits expression of gluconeogenic enzymes and rate of glucose production. In muscle, it increases glucose transport and enhances fatty acid oxidation, due to activation of adenosine monophosphate (AMP) kinase. Adiponectin is reduced in the metabolic syndrome.

1203 Which of the following is a physical finding in metabolic syndrome ?

Harrison's 18th Ed. 1995

- A. Lentigo
- B. Acanthosis nigricans
- C. Café au lait macule
- D. Ephelide (freckle)

Lipoatrophy or acanthosis nigricans is a physical finding in metabolic syndrome.

1204 Which of the following is associated with metabolic syndrome ?

Harrison's 18th Ed. 1995

- A. Nonalcoholic steatohepatitis (NASH)
- B. Polycystic ovarian disease (PCOS)

- C. Obstructive sleep apnea (OSA)
D. All of the above

Apart from insulin resistance, other metabolic alterations specifically associated with metabolic syndrome include increases in apoB and apoC-III, uric acid, prothrombotic factors (fibrinogen, plasminogen activator inhibitor 1), serum viscosity, asymmetric dimethylarginine, homocysteine, white blood cell count, proinflammatory cytokines, CRP, microalbuminuria, nonalcoholic fatty liver disease (NAFLD) and/or nonalcoholic steatohepatitis (NASH), polycystic ovarian disease (PCOS), and obstructive sleep apnea (OSA).

1205 Which of the following is an endogenous inhibitor of nitric oxide synthase (eNOS) ?

Harrison's 18th Ed. 1995

- A. Asymmetric dimethylarginine (ADMA)
B. Dimethyl sulfoxide
C. Phenylbenzimidazole sulfonic acid
D. Homosalate

Endothelial NOS converts amino acid L-arginine into L-citrulline and NO. NO has vasodilator activity. Also, NO inhibits key processes involved in vascular disease, including leukocyte adhesion, platelet aggregation, and vascular smooth muscle cell proliferation. Asymmetric dimethylarginine (ADMA) is an early marker of atherosclerotic vascular disease. ADMA acts as a competitive inhibitor of NO synthase. ADMA is metabolised by dimethylarginine dimethylaminohydrolase (DDAH) to L-citrulline and dimethylamine.

1206 How many kilocalories equal one pound of fat ?

Harrison's 18th Ed. 1996

- A. 500
B. 1500
C. 2500
D. 3500

~3500 kcal = 1 lb of fat.

1207 For each doubling of statin dose, there is an additional lowering of LDL cholesterol by ?

Harrison's 18th Ed. 1996

- A. ~ 2 %
B. ~ 4 %
C. ~ 6 %
D. ~ 8 %

In metabolic syndrome and diabetes, LDL cholesterol should be reduced to <100 mg/dL. Diets restricted in saturated fats (<7% of calories), trans-fats (as few as possible), and cholesterol (<200 mg daily) should be applied aggressively. If LDL cholesterol remains above goal, statins (HMG-CoA reductase inhibitors) may produce a 20–60% lowering of LDL cholesterol. For each doubling of the statin dose, there is only ~6% additional lowering of LDL cholesterol.

1208 In metabolic syndrome treatment, administration of which of the following can increase triglycerides ?

Harrison's 18th Ed. 1996

- A. HMG-CoA reductase inhibitors
B. Ezetimibe
C. Cholestyramine
D. Fibrates

Bile acid sequestrants cholestyramine & colestipol must be used with caution in metabolic syndrome because they can increase triglycerides. They should not be administered when fasting triglycerides are >200 mg/dL.

1209 Drug that lowers triglycerides is ?

Harrison's 18th Ed. 1996-97

- A. Fibrate
B. Nicotinic acid
C. Omega-3 fatty acids

- D. All of the above

Fibrates (gemfibrozil or fenofibrate) is the drug of choice to lower fasting triglycerides (35 - 50% reduction). Other drugs that lower triglycerides include statins, nicotinic acid, and high doses of omega-3 fatty acids. Concomitant administration with drugs metabolized by the 3A4 cytochrome P450 system (including some statins) greatly increases the risk of myopathy.

1210 Which of the following has no effect on HDL cholesterol ?

Harrison's 18th Ed. 1997

- A. Fibrates
B. Bile acid sequestrants
C. Ezetimibe
D. Nicotinic acid

To increase HDL cholesterol, statins, fibrates, and bile acid sequestrants have modest effects (5 - 10%). There is no effect on HDL cholesterol with ezetimibe or omega-3 fatty acids. Nicotinic acid is the only currently available drug with predictable HDL cholesterol-raising properties.

Chapter 243. Ischemic Heart Disease

1211 Which of the following is a determinant of myocardial oxygen demand (MVO₂) ?

Harrison's 18th Ed. 1998

- A. Heart rate
B. Myocardial contractility
C. Myocardial wall tension (stress)
D. All of the above

The major determinants of myocardial oxygen demand (MVO₂) are heart rate, myocardial contractility, and myocardial wall tension (stress).

1212 Majority of blood flow through coronary arteries is during ?

Harrison's 18th Ed. 1998

- A. Systole
B. Diastole
C. Presystole
D. Prediastole

Blood flows through coronary arteries in a phasic fashion, with majority occurring during diastole.

1213 Major determinant of total coronary resistance is found in ?

Harrison's 18th Ed. 1998

- A. Large epicardial arteries (R₁)
B. Prearteriolar vessels (R₂)
C. Arteriolar and intramyocardial capillary vessels (R₃)
D. R₂ + R₃

About 75% of the total coronary resistance to flow occurs across three sets of arteries: (1) large epicardial arteries (Resistance 1 = R₁), (2) prearteriolar vessels (R₂), and (3) arteriolar and intramyocardial capillary vessels (R₃). In the absence of significant flow-limiting atherosclerotic obstructions, R₁ is trivial; the major determinant of coronary resistance is found in R₂ and R₃.

1214 Which of the following statements is false ?

Harrison's 16th Ed. 1434

- A. Large epicardial coronary arteries are conductance vessels
B. Intramyocardial arterioles are resistance vessels
C. Abnormal constriction of conductance vessels can cause Prinzmetal's angina
D. Abnormal constriction of resistance vessels can cause Prinzmetal's angina

Although the large epicardial coronary arteries are capable of constriction and relaxation, in healthy persons they serve as conduits and are referred to as conductance vessels, while the intramyocardial arterioles normally exhibit changes in tone and are therefore referred to as resistance vessels. Abnormal constriction of the conductance vessels can cause severe ischemia in Prinzmetal's angina. Abnormal constriction or failure of normal dilation of coronary resistance vessels causes ischemia termed as microvascular angina.

1215 Which of the following sites has the most predilection for atherosclerotic plaques to develop ?

Harrison's 18th Ed. 1999

- A. Origin of epicardial arteries
- B. Branch points in epicardial arteries
- C. Terminal regions of epicardial arteries
- D. Any of the above

Atherosclerotic plaques have a predilection to develop at sites of increased turbulence in coronary flow like branch points in the epicardial arteries.

1216 Normal myocardium metabolizes which of the following ?

Harrison's 18th Ed. 1999

- A. Fatty acids
- B. Amino acids
- C. Lactate
- D. All of the above

Normal myocardium metabolizes fatty acids and glucose to carbon dioxide and water.

1217 During myocardial ischemia, impairment of cell membrane function leads to ?

Harrison's 18th Ed. 1999

- A. Leakage of potassium from myocytes
- B. Uptake of sodium by myocytes
- C. Increase in cytosolic calcium
- D. All of the above

Impaired myocyte cell membrane function due to ischemia leads to leakage of potassium and uptake of sodium by myocytes as well as an increase in cytosolic calcium.

1218 Minimum duration of total occlusion of epicardial vessel in absence of collaterals for development of myocardial necrosis is ?

Harrison's 18th Ed. 1999

- A. > 20 minutes
- B. > 25 minutes
- C. > 30 minutes
- D. > 35 minutes

Severity & duration of imbalance between myocardial oxygen supply & demand determine whether damage is reversible (<=20 minutes for total occlusion in the absence of collaterals) or whether it is permanent, with subsequent myocardial necrosis (>20 minutes).

1219 In ECG, transient ST-segment depression reflects ?

Harrison's 18th Ed. 1999

- A. Subendocardial ischemia
- B. Transmural ischemia
- C. Epicardial ischemia
- D. All of the above

1220 In ECG, transient ST-segment elevation reflects ?

Harrison's 18th Ed. 1999

- A. Subendocardial ischemia
- B. Transmural ischemia

- C. Epicardial ischemia
- D. All of the above

Ischemia also causes characteristic changes in ECG such as repolarization abnormalities in the form of inversion of T waves and, when more severe, by displacement of ST segments. Transient ST-segment depression reflects patchy subendocardial ischemia, while ST-segment elevation is caused by more severe transmural ischemia.

1221 Coronary atherosclerosis begins to develop at what age ?

Harrison's 18th Ed. 1999

- A. < 20 years
- B. 20 - 30 years
- C. 30 - 40 years
- D. > 40 years

Postmortem studies have shown that coronary atherosclerosis often begins to develop prior to age 20 and is widespread even among adults who were asymptomatic during life.

1222 Squeezing, central, substernal discomfort in angina pectoris is termed ?

Harrison's 18th Ed. 2000

- A. Landolfi's sign
- B. Levine's sign
- C. Lhermitte's sign
- D. Carvollo's sign

Squeezing, central, substernal discomfort indicative of angina pectoris is termed as Levine's sign.

1223 Which of the following statements about angina is false ?

Harrison's 18th Ed. 2000

- A. Angina is usually crescendo-decrescendo in nature
- B. Typically lasts for 10 to 15 minutes
- C. Pain can radiate to both arms
- D. Rarely localized below umbilicus or above mandible

Angina is usually crescendo-decrescendo in nature, typically lasts 2 to 5 minutes, and can radiate to left shoulder and to both arms, especially to the ulnar surfaces of forearm and hand. It can also arise in or radiate to the back, interscapular region, root of the neck, jaw, teeth, and epigastrium. Angina is rarely localized below the umbilicus or above the mandible.

1224 Radiation of chest pain towards which of the following is more typical of pericarditis ?

Harrison's 18th Ed. 2000

- A. Interscapular region
- B. Jaw
- C. Epigastrium
- D. Trapezius muscles

Chest discomfort due to myocardial ischemia does not radiate to the trapezius muscles; such a radiation pattern is more typical of pericarditis.

1225 "Angina decubitus" refers to anginal pain occurring when the patient is in which of the following positions ?

Harrison's 18th Ed. 2000

- A. Squatting
- B. Sitting with legs hanging
- C. Recumbent
- D. Any of the above

Episodes of angina that occur at night while the patient is recumbent is termed as angina decubitus.

1226 Atypical presentations of angina pectoris are more frequent in ?

Harrison's 18th Ed. 2000, N Engl J Med 2005;352:2524-33

- A. Older patients
- B. Diabetics
- C. Women
- D. All of the above

1227 Anginal "equivalents" are all except ?*Harrison's 18th Ed. 2000*

- A. Dyspnea
- B. Fatigue
- C. Palpitation
- D. Faintness

1228 Anginal "equivalents" are more common in ?*Harrison's 18th Ed. 2000*

- A. Women
- B. Smoker
- C. Hypertension
- D. Diabetes mellitus

Anginal "equivalents" are symptoms of myocardial ischemia other than angina. These include dyspnea, fatigue and faintness and are more common in the elderly and in diabetic patients.

1229 Disorders that may cause angina in absence of coronary atherosclerosis are all except ?*Harrison's 18th Ed. 2001*

- A. Hypertrophic cardiomyopathy
- B. Aortic regurgitation
- C. Pulmonary hypertension
- D. Systemic hypertension

Aortic stenosis, aortic regurgitation, pulmonary hypertension and hypertrophic cardiomyopathy may cause angina in the absence of coronary atherosclerosis.

1230 All of the following are indications of discontinuing exercise stress testing except ?*Harrison's 18th Ed. 2001*

- A. Chest discomfort
- B. Severe shortness of breath
- C. Dizziness
- D. Rise in systolic blood pressure > 40 mmHg

1231 All of the following are indications of discontinuing exercise stress testing except ?*Harrison's 18th Ed. 2001*

- A. ST-segment depression > 0.2 mV (2 mm)
- B. Fall in systolic blood pressure > 10 mmHg
- C. Development of supraventricular tachyarrhythmia
- D. Development of ventricular tachyarrhythmia

Treadmill exercise stress test is discontinued upon evidence of chest discomfort, severe shortness of breath, dizziness, severe fatigue, ST-segment depression > 0.2 mV (2 mm), a fall in systolic blood pressure > 10 mmHg, or the development of a ventricular tachyarrhythmia.

1232 False-negative stress test is usual in obstructive disease limited to which coronary artery ?*Harrison's 18th Ed. 2004*

- A. Left anterior descending coronary artery
- B. Left circumflex coronary artery
- C. Right coronary artery

- D. Posterior descending artery

Obstructive disease limited to circumflex coronary artery results in a false-negative stress test since lateral portion of heart which it supplies is not well represented on the surface 12-lead ECG.

1233 Overall sensitivity of exercise stress electrocardiography is ?*Harrison's 18th Ed. 2004*

- A. ~ 55 %
- B. ~ 65 %
- C. ~ 75 %
- D. ~ 85 %

Overall sensitivity of exercise stress electrocardiography is only ~75%.

1234 Incidence of false-positive exercise stress electrocardiography is significantly increased in ?*Harrison's 18th Ed. 2004*

- A. Patients taking digitalis and antiarrhythmic agents
- B. Patients with ventricular hypertrophy
- C. Patients with abnormal serum potassium levels
- D. All of the above

Incidence of false-positive tests is significantly increased in patients with low probabilities of IHD like asymptomatic men <40 years or in premenopausal women with no risk factors for premature atherosclerosis. It is also increased in patients taking cardioactive drugs like digitalis & antiarrhythmic agents, or in those with intraventricular conduction disturbances, resting ST-segment & T-wave abnormalities, ventricular hypertrophy, or abnormal serum potassium levels.

1235 Modified (heart rate limited) exercise stress tests can be earliest performed safely in patients of uncomplicated MI after how many days ?*Harrison's 18th Ed. 2004*

- A. 3 days
- B. 6 days
- C. 9 days
- D. 12 days

Modified (heart rate limited rather than symptom-limited) exercise tests can be performed safely in patients as early as 6 days after uncomplicated MI.

1236 Contraindications to exercise stress testing include all except ?*Harrison's 18th Ed. 2004*

- A. Rest angina within 48 hours
- B. Unstable rhythm
- C. Severe aortic stenosis
- D. Severe mitral stenosis

1237 Contraindications to exercise stress testing include all except ?*Harrison's 18th Ed. 2004*

- A. Acute myocarditis
- B. Uncontrolled heart failure
- C. Hypertension
- D. Active infective endocarditis

Contraindications to exercise stress testing include rest angina within 48 hours, unstable rhythm, severe aortic stenosis, acute myocarditis, uncontrolled heart failure, severe pulmonary hypertension and active infective endocarditis.

1238 Adverse prognostic signs in exercise stress testing include all except ?*Harrison's 18th Ed. 2004*

- A. Failure of blood pressure to increase
- B. Development of angina

- C. Severe ST-segment depression at low workload
- D. ST-segment depression persisting for > 3 minutes after termination of exercise

Failure of BP to increase or an actual decrease with signs of ischemia during the exercise test is an important adverse prognostic sign, since it may reflect ischemia induced global left ventricular dysfunction. Development of angina and/or severe (>0.2 mV) ST-segment depression at a low workload (before completion of stage II of Bruce protocol), and/or ST-segment depression that persists for >5 minutes" after the termination of exercise increases the specificity of the test and suggests severe IHD and a high risk of future adverse events.

1239 Stress myocardial perfusion imaging is more informative than exercise test in all of the following conditions except ?

Harrison's 18th Ed. 2005

- A. Wolff-Parkinson-White syndrome
- B. Left bundle branch block
- C. Right bundle branch block
- D. Paced ventricular rhythm

When resting ECG is abnormal (Wolff-Parkinson-White syndrome, >1 mm of resting ST segment depression, left bundle branch block, paced ventricular rhythm), information gained from an exercise test can be enhanced by stress myocardial perfusion imaging.

1240 Which of the following drugs is used for stress echocardiography ?

Harrison's 18th Ed. 2005

- A. Dipyridamole
- B. Dopamine
- C. Adenosine
- D. All of the above

Intravenous dipyridamole or adenosine can be used in place of exercise for noninvasive stress testing to create a coronary "steal" by temporarily increasing flow in nondiseased segments of the coronary vasculature at the expense of diseased segments. Graded incremental infusion of dobutamine may be administered to increase MVO₂.

1241 Agatston score is used for ?

Harrison's 18th Ed. 2005

- A. Regional wall motion abnormalities
- B. Myocardial ischemia quantification
- C. Coronary calcium quantification
- D. Collateral blood flow quantification

Coronary calcium detected by electron beam computed tomography (EBCT) & multidetector computed tomography (MDCT) is quantified using the Agatston score which is based on the area & density of calcification.

1242 Glagov effect, or positive remodeling refers to ?

N Engl J Med 2005;352:2524-33

- A. As coronary plaque burden increases, atherosclerotic mass tends to stay external to lumen, which allows diameter of lumen to be maintained
- B. Coronary plaque tends to produce different levels of coronary obstruction at different times
- C. Coronary plaque is unduly unstable
- D. All of the above

Coronary arteriography outlines the lumina of the coronary arteries. It provides no information about the arterial wall, and severe atherosclerosis that does not encroach on the lumen may go undetected.

1243 Which of the following is associated with coronary artery aneurysms ?

Harrison's 18th Ed. 2005

- A. Kawasaki disease

- B. Antiphospholipid antibody syndrome
- C. Syphilis
- D. Bacterial endocarditis

Vasculitis of the coronary arteries (intimal proliferation and infiltration of the vessel wall with mononuclear cells) occurs in Kawasaki disease leading to beadlike aneurysms and thromboses, myocardial ischemia and infarction.

1244 Which of the following is not a risk factor for CHD in both men & women ?

Harrison's 16th Ed. 29

- A. Elevated cholesterol levels
- B. Elevated total triglyceride
- C. Hypertension
- D. Smoking

1245 Which of the following is an independent risk factor for CHD in women but not in men ?

Harrison's 16th Ed. 29

- A. Obesity
- B. Low HDL cholesterol
- C. Diabetes
- D. Elevated total triglyceride

Elevated cholesterol levels, hypertension, smoking, obesity, low high-density lipoprotein (HDL) cholesterol levels, diabetes, and lack of physical activity are important risk factors for CHD in both men and women. Total triglyceride levels are an independent risk factor for CHD in women but not in men. Low HDL-cholesterol and diabetes are more important risk factors for CHD in women than in men. Smoking is an important risk factor for CHD in women.it accelerates atherosclerosis, exerts direct negative effects on cardiac function, and is associated with an earlier age of menopause.

1246 Nitroglycerin deteriorates with exposure to ?

Harrison's 17th Ed. 1522

- A. Air
- B. Moisture
- C. Sunlight
- D. All of the above

Nitroglycerin deteriorates with exposure to air, moisture, and sunlight.

1247 Increase in which of the following causes relaxation of vascular smooth muscle ?

Harrison's 18th Ed. 2010

- A. Guanosine diphosphate (GDP)
- B. Guanosine triphosphate (GTP)
- C. Cyclic guanosine monophosphate
- D. Platelet guanylyl cyclase

When metabolized, organic nitrates release nitric oxide (NO) that binds to guanylyl cyclase in vascular smooth muscle cells, leading to an increase in cyclic guanosine monophosphate, which causes relaxation of vascular smooth muscle.

1248 To minimize nitrate tolerance, patient should be kept free of the drug for a minimum of how many hours each day ?

Harrison's 18th Ed. 2010

- A. 2 hours
- B. 4 hours
- C. 6 hours
- D. 8 hours

In order to minimize the effects of nitrate tolerance, minimum effective dose should be used and a minimum of 8 hours each day kept free of the drug.

1249 Asymptomatic persons with severe coronary atherosclerosis include ?

Harrison's 17th Ed. 1526

- A. Patients with higher pain thresholds
- B. Patients with higher endorphin levels
- C. Diabetics with autonomic dysfunction
- D. All of the above

Asymptomatic persons with severe coronary atherosclerosis who exhibit ST-segment changes during activity include those who exhibit higher thresholds to electrically induced pain, higher endorphin levels and diabetics with autonomic dysfunction.

1250 Which of the following drug is useful in the management of angina pectoris ?

Harrison's 18th Ed. 2008, Table 243-4

- A. Betaxolol
- B. Ranolazine
- C. Pentaerythritol tetranitrate
- D. All of the above

Betaxolol is a selective beta 1 blocker. Ranolazine casts its antianginal effect through blockage of late inward sodium current. Pentaerythritol tetranitrate is used sublingually for its antianginal effect.

1251 Which of the following is not a dihydropyridine calcium channel blocker ?

Harrison's 18th Ed. 2009, Table 243-6

- A. Amlodipine
- B. Felodipine
- C. Diltiazem
- D. Isradipine

1252 Which of the following is a nondihydropyridine calcium channel blocker ?

Harrison's 18th Ed. 2009, Table 243-6

- A. Nicardipine
- B. Nifedipine
- C. Nisoldipine
- D. Verapamil

1253 Which of the following calcium channel blocker has the longest duration of action ?

Harrison's 18th Ed. 2009, Table 243-6

- A. Amlodipine
- B. Isradipine
- C. Nisoldipine
- D. Nicardipine

1254 Which of the following calcium channel blocker may be associated with increased risk of mortality if administered during acute myocardial infarction ?

Harrison's 18th Ed. 2009, Table 243-6

- A. Amlodipine
- B. Diltiazem (Immediate release)
- C. Nifedipine (Immediate release)
- D. Verapamil (Immediate release)

Nifedipine (Immediate release) may be associated with increased risk of mortality if administered during acute myocardial infarction. In general, short-acting dihydropyridines should be avoided because of the risk of precipitating infarction, particularly in the absence of beta blockers.

Chapter 244. Unstable Angina and Non-ST-Segment Elevation Myocardial Infarction

1255 Acute coronary syndrome (ACS) includes ?

Harrison's 18th Ed. 2015

- A. ST-segment elevation MI
- B. Non-ST-segment elevation MI
- C. Unstable angina (UA)
- D. All of the above

Patients with IHD fall into two large groups - those with stable angina secondary to chronic coronary artery disease and patients with acute coronary syndromes (ACS). ACS is composed of patients with acute myocardial infarction (MI) with ST-segment elevation on their presenting electrocardiogram (STEMI) and those with unstable angina (UA) and non-ST-segment elevation MI (UA/NSTEMI).

1256 Which of the following is true for unstable angina (UA) ?

Harrison's 18th Ed. 2015

- A. Occurs at rest lasting > 10 minutes
- B. New onset angina pectoris
- C. Occurs with a crescendo pattern
- D. All of the above

UA is defined as angina pectoris or equivalent ischemic discomfort with at least one of three features: it occurs at rest usually lasting > 10 minutes, it is severe and of new onset, and/or it occurs with a crescendo pattern. The diagnosis of NSTEMI is established if a patient with the clinical features of UA develops evidence of myocardial necrosis, as reflected in elevated cardiac biomarkers.

1257 Which of the following is the most common pathophysiologic process in the development of UA ?

Harrison's 18th Ed. 2015

- A. Plaque rupture with superimposed nonocclusive thrombus
- B. Dynamic obstruction
- C. Progressive mechanical obstruction
- D. Increased myocardial oxygen demand and/or decreased supply

UA/NSTEMI can be caused by a reduction in oxygen supply and/or by an increase in myocardial oxygen demand (tachycardia or severe anemia) superimposed on a coronary obstruction. Pathophysiologic processes leading to UA are plaque rupture or erosion with superimposed nonocclusive thrombus (most common cause), dynamic obstruction [coronary spasm, as in Prinzmetal's variant angina], progressive mechanical obstruction [rapidly advancing coronary atherosclerosis or restenosis following percutaneous coronary intervention (PCI)] & secondary UA related to increased myocardial oxygen demand and/or decreased supply (anemia). More than one of these processes may be involved in many patients.

1258 Among patients with UA/NSTEMI, what percentage would have left main stenosis coronary artery disease ?

Harrison's 18th Ed. 2016

- A. 5 %
- B. 15 %
- C. 30 %
- D. 40 %

1259 Among patients with UA/NSTEMI, what percentage would have three-vessel coronary artery disease ?

Harrison's 18th Ed. 2016

- A. 5 %
- B. 15 %
- C. 30 %
- D. 40 %

1260 Among patients with UA/NSTEMI, what percentage would have single-vessel coronary artery disease ?

Harrison's 18th Ed. 2016

- A. 5 %
- B. 15 %
- C. 30 %
- D. 40 %

1261 Among patients with UA/NSTEMI, what percentage would have no critical coronary artery stenosis ?

Harrison's 18th Ed. 2016

- A. 5 %
- B. 10 %
- C. 30 %
- D. 40 %

Among patients with UA/NSTEMI studied at angiography, ~5% have left main stenosis, 15% have three-vessel coronary artery disease, 30% have two-vessel disease, 40% have single-vessel disease, and 10% have no critical coronary stenosis; some of the latter have Prinzmetal's variant angina.

1262 The clinical hallmark of UA/NSTEMI is chest pain that is ?

Harrison's 18th Ed. 2016

- A. Substernal
- B. Retrosternal
- C. Suprasternal
- D. Any of the above

Clinical hallmark of UA/NSTEMI is chest pain, typically located in the substernal region or sometimes in epigastrium, that radiates to the neck, left shoulder, and/or the left arm.

1263 Cardiac biomarkers include ?

Harrison's 16th Ed. 1445

- A. C-reactive protein
- B. B-type natriuretic peptide
- C. CD-40 ligand
- D. All of the above

Elevated levels of CK-MB & troponin distinguish patients with NSTEMI from those with UA. There is a direct relationship between the degree of troponin elevation & mortality. Other cardiac biomarkers C-reactive protein, B-type natriuretic peptide & CD-40 ligand correlate independently with increased mortality & recurrent cardiac events in patients presenting with UA/NSTEMI.

1264 Minor troponin elevations can be caused by ?

Harrison's 18th Ed. 2016

- A. Congestive heart failure
- B. Myocarditis
- C. Pulmonary embolism
- D. All of the above

Minor troponin elevations are due to congestive heart failure, myocarditis or pulmonary embolism.

1265 Risk factor for CAD include ?

Harrison's 18th Ed. 2016

- A. Elevated levels of creatinine
- B. Brain natriuretic peptides
- C. C-reactive protein
- D. All of the above

Besides the seven independent risk factors in Thrombolysis in Myocardial Infarction (TIMI) Trials, other risk factors are diabetes mellitus, left ventricular dysfunction & elevated levels of creatinine, brain natriuretic peptides & C-reactive protein.

1266 B-type natriuretic peptide is a marker of ?

Harrison's 17th Ed. 1528

- A. Vascular inflammation
- B. Increased myocardial wall tension
- C. Plaque rupture
- D. All of the above

C-reactive protein is a marker of vascular inflammation and B-type natriuretic peptide is a marker of increased myocardial wall tension.

1267 Nitrates must not be administered if sildenafil (Viagra) has been used by the patient within the previous ?

Harrison's 18th Ed. 2017

- A. 3 hours
- B. 6 hours
- C. 12 hours
- D. 24 hours

Absolute contraindications to the use of nitrates are hypotension or the use of sildenafil (Viagra) or other drugs in that class within the previous 24 hours.

1268 Letter "C" in CURE trial stands for ?

Harrison's 18th Ed. 2017

- A. Coronary
- B. Carotid
- C. Clopidogrel
- D. Cardiac

CURE is CURE trial stands for Clopidogrel in Unstable Angina to Prevent Recurrent Events.

1269 Prasugrel is contraindicated in patients with ?

Harrison's 18th Ed. 2019

- A. Peripheral artery disease
- B. Prior stroke or transient ischemic attack
- C. Tuberculosis
- D. Hypertension

Thienopyridine drug prasugrel has a more rapid onset, and higher level of platelet inhibition than clopidogrel. Dose is 60 mg load followed by 10 mg/day for up to 15 months. It is contraindicated in patients with prior stroke or transient ischemic attack.

1270 With prasugrel therapy, which of the following was prone to serious bleeding ?

N Engl J Med 2009;361:941

- A. Elderly
- B. Underweight
- C. Patients with previous stroke or transient ischemic attack
- D. All of the above

With prasugrel therapy, three subgroups appeared to be particularly prone to serious bleeding - the elderly, the underweight, and patients with a previous stroke or transient ischemic attack.

1271 Which of the following is a reversible ADP inhibitor ?

Harrison's 18th Ed. 2019

- A. Clopidogrel
- B. Prasugrel
- C. Ticagrelor
- D. All of the above

Ticagrelor is a reversible and direct-acting oral antagonist of the adenosine diphosphate receptor P2Y12. It reduces the risk of cardiovascular death, MI, or stroke by 16% compared with clopidogrel in ACS patients without increasing the risk of total bleeding.

1272 Which of the following is a direct thrombin inhibitor ?

Harrison's 18th Ed. 2019

- A. Heparin
- B. Bivalirudin
- C. Fondaparinux
- D. Enoxaparin

Fondaparinux is a Factor Xa inhibitor. Bivalirudin is a direct thrombin inhibitor. Enoxaparin is a low molecular weight heparin (LMWH).

1273 Laboratory test used to measure the antiplatelet effects of aspirin is ?

- A. Optical platelet aggregation
- B. Skin bleeding time
- C. Urinary 11-dehydrothromboxane B2
- D. All of the above

1274 Prinzmetal's variant angina is due to ?

Harrison's 18th Ed. 2019

- A. Focal spasm of an epicardial coronary artery
- B. Focal spasm of an intramyocardial coronary artery
- C. Diffuse spasm of an epicardial coronary artery
- D. Diffuse spasm of an intramyocardial coronary artery

Described by Prinzmetal in 1959, Prinzmetal's variant angina is due to focal spasm of an epicardial coronary artery, leading to severe myocardial ischemia. It may be related to hypercontractility of vascular smooth muscle due to vasoconstrictor mitogens, leukotrienes, or serotonin.

1275 Prinzmetal's variant angina may be associated with ?

Harrison's 18th Ed. 2019

- A. Migraine
- B. Raynaud's phenomenon
- C. Aspirin-induced asthma
- D. All of the above

Prinzmetal's variant angina is a manifestation of a vasospastic disorder and is associated with migraine, Raynaud's phenomenon or aspirin-induced asthma.

1276 In Prinzmetal's variant angina, focal spasm is most common in ?

Harrison's 18th Ed. 2019

- A. Right coronary artery
- B. Left anterior descending coronary artery
- C. Left circumflex coronary artery
- D. Posterior descending coronary artery

Focal spasm is most common in right coronary artery, and it may occur at one or more sites in one artery or in multiple arteries simultaneously.

1277 Which of the following can be used to provoke focal coronary spasm in Prinzmetal's variant angina ?

Harrison's 18th Ed. 2019

- A. Ergonovine
- B. Acetylcholine
- C. Hyperventilation
- D. All of the above

Ergonovine, acetylcholine & hyperventilation can provoke focal coronary stenosis. It is used to establish the diagnosis of Prinzmetal's variant angina.

1278 Which of the following is false regarding Prinzmetal's variant angina ?

Harrison's 18th Ed. 2019

- A. Nitrates and Ca⁺⁺ channel blockers are main treatments
- B. Ca⁺⁺ channel blockers given in maximally tolerated doses
- C. Prazosin is of no therapeutic value
- D. Aspirin may increase the severity of ischemic episodes

Nitrates & calcium channel blockers are the main treatments for Prinzmetal's variant angina. Calcium antagonists are extremely effective in preventing coronary artery spasm of variant angina & they should be prescribed in maximally tolerated doses. Prazosin, a selective alpha adrenoreceptor blocker, has also been found to be of value in some patients, while aspirin may increase the severity of ischemic episodes. The response to beta blockers is variable.

Chapter 245. ST-Segment Elevation Myocardial Infarction

1279 Early (30-day) mortality rate from acute MI is ?

Harrison's 18th Ed. 2021

- A. ~ 10 %
- B. ~ 20 %
- C. ~ 30 %
- D. ~ 40 %

Early (30-day) mortality rate from AMI is ~30%, with more than half of these deaths occurring before the patient reaches hospital.

1280 Which of the following statements about acute coronary syndromes is false ?

Harrison's 18th Ed. 2021, Figure 245-1

- A. Majority of patients with ST-segment elevation ultimately develop Q-wave on ECG (QwMI)
- B. Majority of patients without ST-segment elevation (NSTEMI) ultimately develop Q-wave on ECG (QwMI)
- C. Mortality due to AMI is fourfold higher in elderly (>75 years) as compared with younger patients
- D. None of the above

Mortality is approximately fourfold higher in elderly patients (over age 75) compared with younger patients. Of patients with ST-segment elevation, the majority ultimately develop a Q-wave on the ECG (QwMI). Majority of patients presenting with NSTEMI do not develop a Q-wave on the ECG.

1281 Histologically, coronary plaques prone to disruption are those with ?

Harrison's 18th Ed. 2022

- A. Rich lipid core and thin fibrous cap
- B. Rich lipid core and thick fibrous cap
- C. Poor lipid core and thin fibrous cap
- D. Poor lipid core and thick fibrous cap

Histologic studies indicate that the coronary plaques prone to disruption are those with a rich lipid core and a thin fibrous cap.

1282 Agonists that promote platelet activation at the site of ruptured plaque include all except ?

Harrison's 18th Ed. 2022

- A. Collagen
- B. ATP
- C. Epinephrine
- D. Serotonin

After an initial platelet monolayer forms at the site of the ruptured plaque, various agonists like collagen, ADP, epinephrine and serotonin promote platelet activation. After agonist stimulation of platelets, there are production and release of thromboxane A2 (a potent local vasoconstrictor), further platelet activation, and potential resistance to thrombolysis.

1283 Which of the following best describes thromboxane A_2 ?*Harrison's 18th Ed. 2022*

- A. Adhesive protein
- B. Local vasoconstrictor
- C. Resistance to fibrinolysis
- D. Platelet aggregator

At the site of disrupted plaque, agonists like collagen, ADP, epinephrine, serotonin promote platelet activation and from them thromboxane A_2 - a potent local vasoconstrictor is released and potential resistance to fibrinolysis develops.

1284 Out of the following, which is the least likely condition that increases risk of developing STEMI ?*Harrison's 18th Ed. 2022*

- A. Collagen vascular disease
- B. Unstable angina
- C. Cocaine abuse
- D. Alcohol abuse

Patients at increased risk of developing STEMI include those with multiple coronary risk factors and those with unstable angina or Prinzmetal's variant angina. Less common underlying medical conditions predisposing patients to STEMI include hypercoagulability, collagen vascular disease, cocaine abuse, and intracardiac thrombi or masses that can produce coronary emboli.

1285 Which of the following best relates to management of STEMI ?*Harrison's 18th Ed. 2022*

- A. The linking theory
- B. Attention to time
- C. Chain of survival
- D. The weak link

Management of STEMI aims at providing expeditious implementation of a reperfusion strategy through a highly integrated system termed as "chain of survival" which involves prehospital care that extends to early hospital management.

1286 STEMI tends to occur most commonly at ?*Harrison's 18th Ed. 2022*

- A. Early morning, few hours before awakening
- B. Morning, within a few hours after awakening
- C. After meals
- D. Late evening, following return from work

Although STEMI may commence at any time of the day or night, circadian variations have been reported such that clusters are seen in the morning within a few hours of awakening.

1287 Which of the following is false regarding 'pain' in STEMI ?*Harrison's 18th Ed. 2022*

- A. Most common presenting complaint
- B. Deep and visceral
- C. Different in character to discomfort of angina pectoris
- D. May radiate as high as occipital area

Pain is the most common presenting complaint in STEMI. Pain is deep & visceral. It is similar in character to discomfort of angina pectoris but is more severe, lasts longer and does not usually subside with cessation of activity. Typically, pain involves central portion of chest and/or epigastrium & on occasion it radiates to arms.

1288 Which of the following is false regarding 'pain' in STEMI ?*Harrison's 18th Ed. 2022*

- A. Does not radiate below umbilicus
- B. May radiate to trapezius
- C. Pain does not subside with cessation of activity
- D. Painless STEMIs are greater in diabetics

Pain of STEMI may radiate as high as occipital area but not below umbilicus. Pain does not subside with cessation of activity, in contrast to angina pectoris. Radiation of discomfort to trapezius is not seen in patients with STEMI & distinguishes it from pericarditis. Painless STEMIs are more in diabetes mellitus, and it increases with age. In elderly, STEMI may present as sudden-onset breathlessness, which may progress to pulmonary edema.

1289 Sympathetic nervous system hyperactivity is more common in ?*Harrison's 18th Ed. 2022*

- A. Anterior infarction
- B. Inferior infarction
- C. Posterior infarction
- D. Lateral infarction

1290 Parasympathetic nervous system hyperactivity is more common in ?*Harrison's 18th Ed. 2022*

- A. Anterior infarction
- B. Inferior infarction
- C. Posterior infarction
- D. Lateral infarction

Combination of substernal chest pain lasting >30 minutes & diaphoresis suggests STEMI. 25% patients with anterior infarction have manifestations of sympathetic nervous system hyperactivity (tachycardia and/or hypertension), and up to one-half with inferior infarction show parasympathetic hyperactivity (bradycardia and/or hypotension).

1291 Which of the following is not an auscultatory finding in myocardial infarction ?*Harrison's 18th Ed. 2022*

- A. Decreased intensity of S1
- B. Paradoxical splitting of S2
- C. Early systolic apical systolic murmur
- D. Pericardial friction rub

A transient midsystolic or late systolic apical systolic murmur due to dysfunction of the mitral valve apparatus may be present in myocardial infarction.

1292 In most patients with transmural myocardial infarction, systolic pressure declines by how much from the preinfarction state ?*Harrison's 18th Ed. 2022*

- A. ~ 5 - 10 mm Hg
- B. ~ 10 - 15 mm Hg
- C. ~ 15 - 20 mm Hg
- D. ~ 20 - 25 mm Hg

In most patients with transmural myocardial infarction, systolic pressure declines by ~ 10 - 15 mmHg from the preinfarction state.

1293 In temporal staging of myocardial infarction, acute stage is ?*Harrison's 18th Ed. 2023*

- A. First few hours
- B. First few hours to 3 days
- C. First few hours to 5 days
- D. First few hours to 7 days

1294 In temporal staging of myocardial infarction, healing stage is ?*Harrison's 18th Ed. 2023*

- A. 3 to 10 days
- B. 7 to 15 days
- C. 10 to 21 days
- D. 7 to 28 days

Myocardial infarction (MI) progresses through three temporal stages - acute (first few hours to 7 days), healing (7 to 28 days) and healed (>=29 days).

1295 Development of a Q wave on ECG is more dependent on ?

Harrison's 18th Ed. 2023

- A. Transmurality of myocardial infarction
- B. Volume of infarcted myocardial tissue
- C. Thickness of the opposite myocardial wall
- D. All of the above

Contemporary studies using MRI suggest that the development of a Q wave on the ECG is more dependent on the volume of infarcted myocardial tissue rather than transmural of infarction.

1296 Which of the following about cardiac biomarkers is false ?

Harrison's 18th Ed. 2023

- A. Detected in serum
- B. Cardiac biomarkers are proteins
- C. Released from necrotic heart muscle
- D. None of the above

Serum cardiac biomarkers are proteins released from necrotic heart muscle after STEMI.

1297 Levels of cTnI and cTnT may remain elevated for how many days after STEMI ?

Harrison's 18th Ed. 2023

- A. 1 to 3 days
- B. 2 to 5 days
- C. 7 to 10 days
- D. 10 to 21 days

Levels of cardiac-specific troponin T (cTnT) and cardiac-specific troponin I (cTnI) detected by highly specific monoclonal antibodies may remain elevated for 7 to 10 days after STEMI.

1298 Cardiac biomarkers that are released into the interstitium are first cleared by ?

Harrison's 18th Ed. 2023, Figure 245-2

- A. Arterioles
- B. Venules
- C. Capillaries
- D. Lymphatics

Cardiac biomarkers that are released into the interstitium are first cleared by lymphatics followed subsequently by spillover into the venous system.

1299 Which of the following is true for levels of creatine phosphokinase (CK) in STEMI ?

Harrison's 18th Ed. 2024

- A. Rises within 10 to 30 minutes
- B. Rises within 30 minutes to 1 hour
- C. Rises within 1 to 4 hours
- D. Rises within 4 to 8 hours

1300 Which of the following is true for levels of creatine phosphokinase (CK) in STEMI ?

Harrison's 18th Ed. 2024

- A. Returns to normal within 24 hours
- B. Returns to normal by 24 to 48 hours
- C. Returns to normal by 48 to 72 hours
- D. Returns to normal by 72 to 96 hours

CK rises within 4 to 8 hours and generally returns to normal by 48 to 72 hours.

1301 When patients with STEMI undergo reperfusion, which of the following is false about cardiac biomarkers ?

Harrison's 18th Ed. 2024

- A. Are detected sooner
- B. Rise to a higher peak value
- C. Decline more rapidly
- D. None of the above

When patients with STEMI undergo reperfusion, cardiac biomarkers are detected sooner, rise to a higher peak value, but decline more rapidly.

1302 Potential sources of total CK elevation are all except ?

Harrison's 18th Ed. 2024

- A. Muscular dystrophy
- B. Myopathies
- C. Polymyositis
- D. Hyperthyroidism

1303 Potential sources of total CK elevation are all except ?

Harrison's 16th Ed. 1451

- A. Alcohol binge
- B. Hypothyroidism
- C. Stroke
- D. Prolonged immobilization

Potential sources of total CK elevation are skeletal muscular diseases (muscular dystrophy, myopathies and polymyositis), electrical cardioversion, hypothyroidism, stroke, surgery, skeletal muscle damage secondary to trauma, convulsions and prolonged immobilization.

1304 What ratio (relative index) of CKMB mass:CK activity suggests myocardial infarction ?

Harrison's 18th Ed. 2024

- A. >=1.2
- B. >=1.8
- C. >=2.2
- D. >=2.5

A ratio (relative index) of CKMB mass : CK activity >=2.5 "suggests" myocardial rather than a skeletal muscle source for the CKMB elevation.

1305 Which of the following is false about myoglobin in STEMI ?

Harrison's 18th Ed. 2024

- A. First serum cardiac markers to rise after STEMI
- B. High cardiac specificity
- C. Rapidly excreted in urine
- D. Blood levels return to normal within 24 hours

Myoglobin is one of the first serum cardiac markers that rises after STEMI but it lacks cardiac specificity. It is rapidly excreted in urine therefore blood levels return to normal range within 24 hours of the onset of myocardial infarction.

1306 In acute MI patients with hypoxemia, O₂ is administered by nasal prongs or face mask at the rate of ?

Harrison's 18th Ed. 2025

- A. 2 - 4 L/minute
- B. 4 - 6 L/minute
- C. 6 - 8 L/minute
- D. 8 - 10 L/minute

In STEMI patients, whose arterial O₂ saturation is normal, supplemental O₂ is of limited clinical benefit. When hypoxemia is present, O₂ is given by nasal prongs or face mask @ 2 - 4 L/minute for the first 6 to 12 hours after infarction and then according to the situation.

1307 Therapy with nitrates in STEMI should be avoided in ?*Harrison's 18th Ed. 2025*

- A. Low systolic arterial pressure (< 90 mm Hg)
- B. When there is clinical suspicion of RV infarction
- C. Who have taken 'sildenafil' within preceding 24 hours
- D. All of the above

Therapy with nitrates is avoided in MI patients who have low systolic arterial pressure (<90 mmHg) or in whom there is clinical suspicion of RV infarction (inferior infarction on ECG, elevated jugular venous pressure, clear lungs & hypotension). Nitrates should not be administered to patients who have taken phosphodiesterase-5 inhibitor sildenafil within the preceding 24 hours since it may potentiate the hypotensive effects of nitrates.

1308 In STEMI, three doses of sublingual nitroglycerin (0.4 mg) should be administered at an interval of ?*Harrison's 18th Ed. 2025*

- A. 5 minutes
- B. 30 minutes
- C. One hour
- D. Three hours

Sublingual nitroglycerin can be given safely to most patients with STEMI. Up to three doses of 0.4 mg should be administered at about 5 minute intervals.

1309 Idiosyncratic hypotensive reaction to nitrates is reversed promptly by ?*Harrison's 18th Ed. 2025*

- A. IV Calcium gluconate
- B. IV Atropine
- C. IV Norepinephrine
- D. IV Fluids

An idiosyncratic reaction to nitrates, consisting of sudden marked hypotension can be reversed promptly by the prompt administration of intravenous atropine.

1310 Which of the following about morphine in acute MI is false ?*Harrison's 18th Ed. 2025*

- A. Morphine has a vagotonic effect
- B. May cause advanced heart block particularly in patients with anterior wall infarction
- C. Should be given IV rather than subcutaneously
- D. None of the above

Morphine has vagotonic effect & may cause bradycardia or advanced degrees of heart block particularly in patients with posteroinferior infarction. These side effects respond to atropine. Morphine is routinely administered by repetitive (every 5 min) intravenous injection of small doses (2 - 4 mg) rather than by subcutaneous administration of a larger quantity, because absorption may be unpredictable by subcutaneous route.

1311 Which of the following about IV β -blockers in acute MI is false ?*Harrison's 18th Ed. 2025*

- A. Useful in the control of pain of STEMI
- B. Reduce the risks of reinfarction
- C. Reduce the risks of ventricular fibrillation
- D. None of the above

Intravenous beta blockers are useful in the control of pain of STEMI by diminishing myocardial O_2 demand & ischemia. Intravenous beta blockers reduce risks of reinfarction & ventricular fibrillation.

1312 What proportion of patients with STEMI may achieve spontaneous reperfusion of infarct-related coronary artery within 24 hours ?*Harrison's 18th Ed. 2026*

- A. One - fourth

- B. One - third
- C. One - half
- D. Two - third

Up to one - third of patients with STEMI may achieve spontaneous reperfusion of the infarct-related coronary artery within 24 hours.

1313 Which of the following drugs should be avoided in patients with STEMI ?*Harrison's 18th Ed. 2026*

- A. Glucocorticoids
- B. Nonsteroidal anti-inflammatory agents
- C. Short-acting dihydropyridines calcium antagonists
- D. All of the above

Short-acting dihydropyridine calcium antagonists may be associated with an increased mortality risk in STEMI. Glucocorticoids and nonsteroidal anti-inflammatory agents (other than aspirin), should be avoided in STEMI as they can impair infarct healing & increase the risk of myocardial rupture, and their use may result in a larger infarct scar. These also increase coronary vascular resistance, thereby potentially reducing flow to ischemic myocardium.

1314 In STEMI, the goal is to keep total ischemic time within ?*Harrison's 18th Ed. 2026, Figure 245-4*

- A. 30 minutes
- B. 60 minutes
- C. 90 minutes
- D. 120 minutes

In STEMI, the goal is to keep total ischemic time within 120 minutes.

1315 In STEMI, the golden hour refers to ?*Harrison's 18th Ed. 2026, Figure 245-4*

- A. First 15 minutes
- B. First 30 minutes
- C. First 60 minutes
- D. First 180 minutes

1316 A cardiologist is considered as an "experienced operator" if he has does how many percutaneous coronary intervention (PCI) cases per year ?*Harrison's 18th Ed. 2027*

- A. ≥ 15
- B. ≥ 25
- C. ≥ 50
- D. ≥ 75

A cardiologist is considered as an "experienced operator" if he does ≥ 75 percutaneous coronary intervention (PCI) cases per year.

1317 A cardiological unit is considered as a "dedicated medical center" if it does how many percutaneous coronary intervention (PCI) cases per year ?*Harrison's 18th Ed. 2027*

- A. ≥ 5
- B. ≥ 15
- C. ≥ 25
- D. ≥ 36

A cardiological unit is considered as a "dedicated medical center" if it does ≥ 36 percutaneous coronary intervention (PCI) cases per year.

1318 In STEMI, fibrinolytic therapy should ideally be initiated within ?*Harrison's 18th Ed. 2027*

- A. 10 minutes of presentation
- B. 30 minutes of presentation
- C. 60 minutes of presentation
- D. 90 minutes of presentation

In STEMI, fibrinolytic therapy should ideally be initiated within 30 minutes of presentation (door-to-needle time 30 minutes) with a principal goal to promptly restore full coronary arterial patency (TIMI grade 3).

1319 Which of the following fibrinolytic agent acts by promoting conversion of plasminogen to plasmin ?

Harrison's 18th Ed. 2027

- A. Tissue plasminogen activator (tPA)
- B. Streptokinase
- C. Tenecteplase (TNK)
- D. All of the above

Tissue plasminogen activator (tPA), streptokinase, tenecteplase (TNK), and reteplase (rPA) are fibrinolytic agents that act by promoting conversion of plasminogen to plasmin, which subsequently lyses fibrin thrombi.

1320 Which of the following is a 'bolus fibrinolytic' agent ?

Harrison's 18th Ed. 2027

- A. Streptokinase
- B. Tenecteplase (TNK)
- C. Urokinase
- D. Tissue plasminogen activator (tPA)

1321 Which of the following is a 'bolus fibrinolytic' agent ?

Harrison's 18th Ed. 2027

- A. Streptokinase
- B. Reteplase (rPA)
- C. Urokinase
- D. Tissue plasminogen activator (tPA)

Tenecteplase (TNK) & reteplase (rPA) are bolus fibrinolytics since their administration does not require a prolonged intravenous infusion.

1322 Angiographically flow in the culprit coronary artery is assessed by which of the following grading system ?

Harrison's 18th Ed. 2027

- A. TIMI
- B. ISIS
- C. CURE
- D. CAPRIE

When assessed angiographically, flow in the culprit coronary artery is described by a simple qualitative scale called the thrombolysis in myocardial infarction (TIMI) grading system.

1323 Method of angiographic assessment of the efficacy of fibrinolysis is ?

Harrison's 18th Ed. 2027

- A. TIMI flow grade
- B. TIMI frame count
- C. TIMI myocardial perfusion grade
- D. All of the above

Qualitative scale to angiographically assess flow in the culprit coronary artery is the thrombolysis in myocardial infarction (TIMI) grading system. Grade 0 - complete occlusion of infarct-related artery (IRA), grade 1 - some penetration of contrast material beyond the point of obstruction but without perfusion of distal coronary bed, grade 2 - perfusion of entire infarct vessel into distal bed, but with flow that is delayed compared with that of a normal artery and grade 3 - full perfusion of the infarct vessel with normal flow. Additional methods of angiographic assessment

of efficacy of fibrinolysis include counting the number of frames on cine film required for dye to flow from the origin of the IRA to a landmark in distal vascular bed (TIMI frame count) and determining the rate of entry and exit of contrast dye from microvasculature in myocardial infarct zone (TIMI myocardial perfusion grade).

1324 Which TIMI flow grade indicates full perfusion of infarct vessel with normal flow following reperfusion therapy ?

Harrison's 18th Ed. 2027

- A. TIMI 1
- B. TIMI 2
- C. TIMI 3
- D. TIMI 4

TIMI grade 3 indicates full perfusion of the infarct vessel with normal flow which is the goal of reperfusion therapy.

1325 In STEMI, fibrinolytic therapy can reduce the relative risk of in-hospital death by up to ?

Harrison's 18th Ed. 2027

- A. 10 %
- B. 25 %
- C. 50 %
- D. 75 %

In STEMI, fibrinolytic therapy can reduce the relative risk of in-hospital death by up to 50% when administered within the first hour of the onset of symptoms. Benefit is maintained for at least 10 years.

1326 Which of the following is given as a "single" weight-based intravenous bolus ?

Harrison's 18th Ed. 2027

- A. Tissue plasminogen activator (tPA)
- B. Reteplase (rPA)
- C. Tenecteplase (TNK)
- D. Streptokinase (STK)

TNK is given as a "single" weight-based intravenous bolus of 0.53 mg/kg over 10 seconds.

1327 Which of the following fibrinolytic agent is administered in a double-bolus regimen ?

Harrison's 18th Ed. 2027

- A. Tissue plasminogen activator (tPA)
- B. Reteplase (rPA)
- C. Tenecteplase (TNK)
- D. Streptokinase (STK)

tPA is given as a 15 mg bolus followed by 50 mg intravenously over the first 30 minutes, followed by 35 mg over the next 60 minutes. Streptokinase is administered as 1.5 million units (MU) intravenously over 1 hour. rPA is administered in a double-bolus regimen consisting of a 10-MU bolus given over 2 - 3 minutes, followed by a second 10-MU bolus 30 minutes later.

1328 Combination reperfusion regimens involve giving a fibrinolytic agent with which of the following ?

Harrison's 18th Ed. 2027

- A. Aspirin
- B. Clopidogrel
- C. Intravenous glycoprotein IIb/IIIa inhibitor
- D. Percutaneous coronary intervention (PCI)

Combination reperfusion regimens for coronary reperfusion combine an intravenous glycoprotein IIb/IIIa inhibitor with a reduced dose of a fibrinolytic agent.

1329 Clear contraindications to the use of fibrinolytic agents are all except ?

Harrison's 18th Ed. 2028

- A Cerebrovascular hemorrhage at any time
- B Nonhemorrhagic stroke at any time
- C Suspicion of aortic dissection
- D Active internal bleeding

Clear contraindications to the use of fibrinolytic agents include a history of cerebrovascular hemorrhage at any time, a nonhemorrhagic stroke or other cerebrovascular event within the past year, marked hypertension (>180/110 mmHg) at any time during acute presentation, suspicion of aortic dissection, and active internal bleeding (excluding menses).

1330 In STEMI, which of the following is a relative contraindication to fibrinolytic therapy ?

Harrison's 18th Ed. 2028

- A Current use of anticoagulants (INR >=2)
- B Pregnancy
- C Hemorrhagic diabetic retinopathy
- D All of the above

Relative contraindications to fibrinolytic therapy, which require clinical consideration of risk:benefit ratio include current use of anticoagulants (INR >=2), a recent (<2 weeks) invasive or surgical procedure or prolonged (>10 minute) cardiopulmonary resuscitation, known bleeding diathesis, pregnancy, a hemorrhagic ophthalmic condition (hemorrhagic diabetic retinopathy), active peptic ulcer disease, and a history of severe hypertension that is currently adequately controlled.

1331 For what period, streptokinase should not given, if the patient has received it in past ?

Harrison's 18th Ed. 2028

- A Never in life
- B 5 days to 2 years
- C 1 to 2 years
- D 3 to 5 years

Because of the risk of an allergic reaction, patients should not receive streptokinase if that agent had been received within the preceding 5 days to 2 years.

1332 Allergic reactions to streptokinase occur in about what percentage of patients who receive it ?

Harrison's 18th Ed. 2028

- A 1 %
- B 2 %
- C 3 %
- D 4 %

Allergic reactions to streptokinase occur in ~2% of patients who receive it.

1333 Minor degree of hypotension occurs in what percentage of patients who receive streptokinase ?

Harrison's 18th Ed. 2028

- A 4 - 10 %
- B 10 - 16 %
- C 16 - 30 %
- D 30 - 40 %

Minor hypotension occurs in 4 - 10 % of patients given STK, marked hypotension occurs rarely.

1334 Hemorrhagic stroke occurs in about what percentage of patients who receive streptokinase ?

Harrison's 18th Ed. 2028

- A 0.1 - 0.5 %
- B 0.5 - 0.9 %
- C 0.9 - 1.5 %

- D 1.5 - 2.4 %

Hemorrhagic stroke, the most serious complication, occurs in ~0.5 - 0.9% of patients receiving fibrinolytic agents. Rate of intracranial hemorrhage with tPA or rPA is slightly higher than with STK.

1335 Patients with confirmed STEMI and low risk may be safely transferred out of the coronary care unit within ?

Harrison's 18th Ed. 2029

- A 6 hours
- B 12 hours
- C 24 hours
- D 48 hours

Patients with confirmed STEMI & low risk (no prior MI & no persistent chest discomfort, CHF, hypotension or cardiac arrhythmias) may be safely transferred out of CCU within 24 hours.

1336 Patients with STEMI should be kept at bed rest for the first ?

Harrison's 18th Ed. 2029

- A 3 hours
- B 6 hours
- C 12 hours
- D 24 hours

Patients with STEMI should be at bed rest for the first 12 hours. In the absence of complications, patients should be encouraged, under supervision, to resume an upright posture by dangling their feet over the side of the bed & sitting in a chair within the first 24 hours. By day 3 after MI, patients should increase their ambulation progressively to a goal of 185 meters (600 ft) three times a day.

1337 In STEMI, diet rich in which of the following is recommended ?

Harrison's 18th Ed. 2029

- A Potassium
- B Magnesium
- C Fiber
- D All of the above

In STEMI, foods that are high in potassium, magnesium, and fiber, but low in sodium are recommended.

1338 Which of the following drugs used in coronary care unit can produce delirium, particularly in the elderly ?

Harrison's 18th Ed. 2029

- A Atropine
- B H₂ blockers
- C Narcotics
- D All of the above

Atropine, H₂ blockers & narcotics can produce delirium, particularly in the elderly.

1339 In STEMI, goal of treatment with antiplatelet and anticoagulant agents is ?

Harrison's 18th Ed. 2029

- A To maintain patency of infarct-related artery (IRA)
- B To reduce likelihood of mural thrombus formation
- C To reduce likelihood of deep venous thrombosis
- D All of the above

1340 Data from Antiplatelet Trialists' Collaboration shows a relative reduction in mortality of how much in patients with MI receiving antiplatelet agents ?

Harrison's 18th Ed. 2029

- A 12 %
- B 21 %

- C. 27 %
D. 34 %

Data from Antiplatelet Trialists' Collaboration patients with MI showed a relative reduction of 27% in mortality rate, from 14.2% in control patients to 10.4% in patients receiving antiplatelet agents.

1341 In STEMI, the maximum recommended dose of UFH given as an initial bolus is ?

Harrison's 18th Ed. 2030

- A. 2500 U
B. 4000 U
C. 5000 U
D. 7500 U

1342 In STEMI, the maximum recommended dose of UFH given after the initial bolus is ?

Harrison's 18th Ed. 2030

- A. 500 U / hour
B. 1000 U / hour
C. 1500 U / hour
D. 2000 U / hour

1343 In STEMI, with the use of UFH, activated partial thromboplastin time during maintenance therapy should be ?

Harrison's 18th Ed. 2030

- A. 1.5 times the control value
B. 1.5 - 2 times the control value
C. 2.5 - 3 times the control value
D. 3 - 3.5 times the control value

In STEMI, the recommended dose of UFH is an initial bolus of 60 U/kg (maximum 4000 U) followed by an initial infusion of 12 U/kg per hour (maximum 1000 U/hour). Activated partial thromboplastin time during maintenance therapy should be 1.5 - 2 times the control value.

1344 In STEMI, which of the following can be used as an alternative to UFH for anticoagulation ?

Harrison's 18th Ed. 2030

- A. Fondaparinux
B. Bivalirudin
C. Enoxaparin
D. All of the above

Advantages of low-molecular-weight heparin (LMWH) preparations include high bioavailability permitting administration subcutaneously, reliable anticoagulation without monitoring, and greater antiXa:IIa activity.

1345 Which of the undermentioned myocardial infarction has an increased risk of systemic or pulmonary thromboembolism ?

Harrison's 18th Ed. 2030

- A. Anterior
B. Inferior
C. Posterior
D. Lateral

Patients with anterior myocardial infarction, severe LV dysfunction, heart failure, history of embolism, 2D echocardiographic evidence of mural thrombus or atrial fibrillation are at increased risk of systemic or pulmonary thromboembolism.

1346 Which of the following medication is least useful during the first 24 - 48 hours after the onset of myocardial infarction ?

Harrison's 18th Ed. 2030

- A. Intravenous nitroglycerin

- B. Angiotensin-converting enzyme (ACE) inhibitors
C. Beta blockers
D. Unfractionated heparin (UFH)

Benefits of routine use of intravenous nitroglycerin are less in contemporary era where beta-adrenoceptor blockers & ACE inhibitors are routinely prescribed for patients with STEMI.

1347 Patients with rales at lung bases, S₃ gallop, tachypnea, or signs of right heart failure belong to which Killip class ?

Harrison's 18th Ed. 2031

- A. Killip class I
B. Killip class II
C. Killip class III
D. Killip class IV

Killip classification divides patients into four groups. Class I - no signs of pulmonary or venous congestion, class II - rales at lung bases, S₃ gallop, tachypnea, or signs of right heart failure, class III - severe heart failure, pulmonary edema and class IV - shock with systolic pressure <90 mmHg, peripheral vasoconstriction, peripheral cyanosis, mental confusion, and oliguria.

1348 In STEMI, what proportion of patients present with cardiogenic shock on admission ?

Harrison's 18th Ed. 2031

- A. 1 %
B. 5 %
C. 10 %
D. 20 %

Only 10% of patients with STEMI present with cardiogenic shock on admission. 90% develop it during hospitalization.

1349 Infarction of what percentage of left ventricle results in cardiogenic shock ?

Harrison's 18th Ed. 2031

- A. About 20 %
B. About 30 %
C. About 35 %
D. About 40 %

Hemodynamic evidence of abnormal LV function appears when contraction is seriously impaired in 20 to 25% of the left ventricle. Infarction of >=40% of left ventricle results in cardiogenic shock.

1350 Which of the following is not true for cardiogenic shock ?

Harrison's 16th Ed. 1613

- A. Sustained systolic arterial pressure of <60 mmHg
B. Cardiac index < 2.2 L/(min/m²)
C. Elevated pulmonary capillary wedge pressure (>18 mmHg)
D. Generally associated with mortality rate of >50%

Cardiogenic shock (CS) is characterized by systemic hypoperfusion due to severe depression of cardiac index [<2.2 (L/min)/m²] & sustained systolic arterial hypotension (<90 mmHg), despite an elevated filling pressure (PCWP > 18 mmHg). In-hospital mortality rate is >50%.

1351 What is true for right ventricular myocardial infarction ?

Harrison's 16th Ed. 1456

- A. Associated with occlusion of proximal RCA
B. ST-segment elevation of >1 mm in lead V₄R
C. Upright T wave in lead V₄R during initial hours
D. All of the above

1352 Ventricular tachycardia or fibrillation refractory to electroshock is more responsive after patient is treated with ?

Harrison's 16th Ed. 1457

- A. Epinephrine
- B. Bretylium
- C. Amiodarone
- D. All of the above

Ventricular tachycardia or fibrillation that is refractory to electroshock may be more responsive after patient is treated with epinephrine (1 mg intravenously or 10 mL of a 1:10,000 solution via the intracardiac route), bretylium (5-mg/kg bolus) or amiodarone (75 to 150-mg bolus).

1353 Implantable cardioverter/defibrillator (ICD) is recommended for which of the following ?

Harrison's 18th Ed. 2033, Figure 245-6

- A. LVEF is <30-40% and NYHA class II
- B. LVEF is <30-40% and NYHA class III
- C. LVEF is <30-35% and NYHA class I
- D. All of the above

Patients with depressed left ventricular function at least 40 days post-STEMI are referred for insertion of an implantable cardioverter/defibrillator (ICD) if the LVEF is <30-40% with NYHA class II-III or if LVEF is <30-35% with NYHA class I functional status. Patients with preserved left ventricular function (LVEF >40%) do not receive an ICD regardless of NYHA functional class.

1354 Which of the following is false about recurrent post STEMI angina ?

Harrison's 17th Ed. 1542

- A. Develops in ~25% of patients hospitalized for STEMI
- B. More frequent in those who have successful fibrinolysis
- C. Repeat fibrinolysis is an alternative
- D. None of the above

Recurrent angina develops in ~25% of patients hospitalized for STEMI. It is even higher in patients who undergo successful fibrinolysis. Repeat administration of a fibrinolytic agent is an alternative to early mechanical revascularization.

1355 Usual duration of hospitalization for an uncomplicated STEMI is about ?

Harrison's 18th Ed. 2034

- A. 3 days
- B. 5 days
- C. 7 days
- D. 10 days

Usual duration of hospitalization for an uncomplicated STEMI is about 5 days.

1356 Intravenous antiplatelet drugs include ?

Harrison's 16th Ed. 688

- A. Abciximab
- B. Eptifibatide
- C. Tirofiban
- D. All of the above

Three potent parenteral GpIIb/IIIa inhibitors are Abciximab (chimeric monoclonal Fab fragment of human & murine protein that binds to GpIIb/IIIa), Eptifibatide (synthetic cyclic heptapeptide with a KGD sequence) and Tirofiban (synthetic peptidomimetic based on the RGD sequence).

1357 ATP in "National Cholesterol Education Project ATP III" stands for ?

Harrison's 16th Ed. 1430

- A. Adult Treatment Panel
- B. Advanced Treatment Panel
- C. Aggressive Treatment Panel
- D. Angina Treatment Panel

Adult Treatment Panel III (ATP III).

1358 The technique "Percutaneous transluminal coronary angioplasty" (PTCA) was first introduced by ?

Harrison's 17th Ed. 1544

- A. Andreas Gruntzig
- B. Denton Cooley
- C. Micheal DeBakey
- D. Christian Bernard

In 1977, Andreas Gruntzig introduced percutaneous transluminal coronary angioplasty (PTCA).

1359 During percutaneous coronary intervention (PCI), steerable guidewire put into coronary artery lumen has a diameter of ?

Harrison's 17th Ed. 1544

- A. < 0.4 mm
- B. < 0.6 mm
- C. < 0.8 mm
- D. < 1 mm

During PCI, steerable guidewire put into coronary artery lumen has a diameter of < 0.4 mm.

1360 What suggests involvement of right coronary artery rather than left circumflex artery as the culprit vessel in inferior MI ?

N Engl J Med 2003;348:933-40

- A. Greater ST-segment elevation in lead II than in lead III & ST-segment depression of >1 mm in leads I & aVL
- B. Greater ST-segment elevation in lead III than in lead II & ST-segment depression of >1 mm in leads I & aVL
- C. Greater ST-segment elevation in lead aVF than in lead II or III & ST-segment depression of >1 mm in leads I & aVL
- D. Greater ST-segment elevation in lead II & III than in lead aVF & ST-segment depression of >1 mm in leads I & aVL

1361 In inferior MI, ST-segment depression in leads V₁ and V₂ suggest concomitant infarction of ?

N Engl J Med 2003;348:933-40

- A. Lateral wall of left ventricle
- B. Posterior wall of left ventricle
- C. Anterior wall of left ventricle
- D. Atrial infarction

1362 Most sensitive electrocardiographic sign of right ventricular infarction is ?

N Engl J Med 2003;348:933-40

- A. ST-segment elevation of >1 mm in V₄R with upright T wave during first 12 hours
- B. ST-segment elevation of >1 mm in V₄R with inverted T wave during first 12 hours
- C. ST-segment elevation of >1 mm in V₄R with upright T wave after first 12 hours
- D. ST-segment elevation of >1 mm in V₄R with inverted T wave after first 12 hours

1363 Proximal occlusion of the left anterior descending artery is indicated by ?

N Engl J Med 2003;348:933-40

- A. Anterior wall MI, ST elevation in V₁, V₂, and V₃
- B. Anterior wall MI, ST elevation in V₁, V₂, and V₃ & aVL

- C. Anterior wall MI, ST elevation in V_1, V_2, V_3 & aVL with ST depression of >1 mm in lead aVF
- D. Anterior wall MI, ST elevation in V_1, V_2, V_3 & aVL with ST depression of >1 mm in lead II, III and aVF

1364 Which of the following statements about blood supply of sinus node is true ?

N Engl J Med 2003;348:933-40

- A. Supplied by RCA in 60 % of people and by the left circumflex artery in 40 %
- B. Supplied by RCA in 40 % of people and by left circumflex artery in 60 %
- C. Supplied by RCA in 80 % of people and by left circumflex artery in 20 %
- D. Supplied by RCA in 60 % of people and by left anterior descending artery in 40 %

1365 Which of the following statements about blood supply of atrioventricular node is true ?

N Engl J Med 2003;348:933-40

- A. Supplied by RCA in 50 % of people and by left circumflex artery in 50 %
- B. Supplied by RCA in 60 % of people and by left circumflex artery in 40 %
- C. Supplied by RCA in 75 % of people and by left circumflex artery in 25 %
- D. Supplied by RCA in 90 % of people and by left circumflex artery in 10 %

1366 Which of the following statements about blood supply of bundle of His is true ?

N Engl J Med 2003;348:933-40

- A. Supplied by atrioventricular nodal branch of LAD
- B. Supplied by atrioventricular nodal branch of RCA + septal perforators of LAD
- C. Supplied by atrioventricular nodal branch of left circumflex artery + septal perforators of LAD
- D. Supplied by septal branch of left circumflex artery

1367 Which of the following statements about blood supply of right bundle branch is true ?

N Engl J Med 2003;348:933-40

- A. Supplied by septal perforators of LAD
- B. Supplied by septal perforators of RCA
- C. Supplied by septal perforators of left circumflex artery
- D. None of the above

1368 Which of the following is an electrocardiographic predictor of myocardial reperfusion following thrombolysis ?

N Engl J Med 2003;348:933-40

- A. T-wave inversion in < 4 hours after MI
- B. ST-segment resolution during first 90 minutes
- C. Accelerated idioventricular rhythm
- D. All of the above

Chapter 247. Hypertensive Vascular Disease

1369 According to JNC 7, stage 2 hypertension is ?

N Engl J Med 2006;355:385-92

- A. 120/80 mm Hg
- B. 140-159/90-99
- C. $\geq 160/100$ mm Hg
- D. 180/110 mm Hg

1370 Isolated systolic hypertension is defined as a systolic pressure of ≥ 140 mm Hg and a diastolic pressure below ?

N Engl J Med 2006;355:385-92

- A. 70 mm Hg
- B. 80 mm Hg
- C. 90 mm Hg
- D. 100 mm Hg

1371 Among adults, diastolic blood pressure increases progressively until what age, after which it tends to decrease ?

Harrison's 18th Ed. 2042

- A. ~ 45 years
- B. ~ 55 years
- C. ~ 65 years
- D. ~ 75 years

Among adults, diastolic blood pressure increases progressively with age until ~55 years, after which it tends to decrease.

1372 The probability that a middle-aged or elderly individual will develop hypertension in his or her lifetime is ?

Harrison's 18th Ed. 2042

- A. 10 %
- B. 30 %
- C. 60 %
- D. 90 %

Probability that a middle-aged / elderly individual will develop hypertension in lifetime is 90%.

1373 Which of the following statements about age-related increase of blood pressure is false ?

Harrison's 18th Ed. 2042

- A. Augmented by high NaCl intake
- B. Augmented by low dietary intakes of calcium
- C. Augmented by low dietary intakes of potassium
- D. None of the above

Hypertension prevalence is related to dietary NaCl intake, & age-related increase of BP is augmented by high NaCl intake. Low dietary intakes of calcium & potassium contribute to risk of hypertension.

1374 High BP before age 55 occurs how many times more frequently among persons with a positive family history of hypertension ?

Harrison's 18th Ed. 2042

- A. 1.8 times
- B. 2.8 times
- C. 3.8 times
- D. 4.8 times

High blood pressure before age 55 occurs 3.8 times more frequently among persons with a positive family history of hypertension.

1375 Which of the following is considered as a hypertension-related gene ?

Harrison's 18th Ed. 2042

- A. Alpha-adducin gene
- B. MDR1 gene
- C. NAT2 gene
- D. All of the above

Alpha adducin gene encodes a cytoskeletal protein important for renal tubular sodium absorption. It is thought to be associated with increased renal tubular absorption of sodium, and variants of this gene may be associated with hypertension and salt sensitivity of blood pressure.

1376 Which of the following genes is possibly related to hypertension ?

Harrison's 18th Ed. 2042

- A. Gene encoding AT₁ receptor
- B. Gene encoding aldosterone synthase
- C. Gene encoding β_2 adrenoreceptor
- D. All of the above

Genes possibly related to hypertension include genes encoding the AT₁ receptor, aldosterone synthase, and the β_2 adrenoreceptor.

1377 Which of the following statements about genesis of hypertension is false ?

Harrison's 18th Ed. 2043

- A. Vascular volume is a primary determinant of arterial pressure over the long term
- B. Nonchloride salts of sodium have little or no effect on blood pressure
- C. Salt-wasting disorders are associated with low blood pressure levels
- D. None of the above

1378 The autonomic nervous system maintains cardiovascular homeostasis via which of the following signals ?

Harrison's 18th Ed. 2043

- A. Pressure signals
- B. Volume signals
- C. Chemoreceptor signals
- D. All of the above

The autonomic nervous system maintains cardiovascular homeostasis via pressure, volume, and chemoreceptor signals.

1379 Which of the following is an endogenous catecholamine ?

Harrison's 18th Ed. 2043

- A. Norepinephrine
- B. Epinephrine
- C. Dopamine
- D. All of the above

The three endogenous catecholamines are norepinephrine, epinephrine, and dopamine. They play important roles in tonic and phasic cardiovascular regulation.

1380 The activities of the adrenergic receptors are mediated by ?

Harrison's 18th Ed. 2043

- A. Receptor Tyrosine Kinase
- B. Cytokine Receptor-Linked Kinase

- C. Guanosine nucleotide-binding regulatory proteins
- D. Serine Kinase

The activities of adrenergic receptors are mediated by guanosine nucleotide-binding regulatory proteins (G proteins) & by intracellular concentrations of downstream second messengers.

1381 When activated by catecholamines, which of the following receptors act as negative feedback controllers, inhibiting further norepinephrine release ?

Harrison's 18th Ed. 2043

- A. α_1
- B. α_2
- C. β_1
- D. β_2

When activated by catecholamines, α_2 receptors act as negative feedback controllers, inhibiting further norepinephrine release.

1382 In the kidney, activation of which of the following increases renal tubular reabsorption of sodium ?

Harrison's 18th Ed. 2043

- A. α_1 -adrenergic receptors
- B. α_2 -adrenergic receptors
- C. β_1 -adrenergic receptors
- D. β_2 -adrenergic receptors

In kidney, activation of α_1 -adrenergic receptors increases renal tubular reabsorption of sodium.

1383 Activation of which of the following receptors by epinephrine relaxes vascular smooth muscle leading to vasodilation ?

Harrison's 18th Ed. 2043

- A. α_1
- B. α_2
- C. β_1
- D. β_2

Activation of β_2 receptors by epinephrine relaxes vascular smooth muscle & results in vasodilation.

1384 Which of the following is false about Renin ?

Harrison's 18th Ed. 2044

- A. Prorenin is an enzymatically inactive precursor
- B. Synthesized in renal afferent renal arteriole
- C. Plasma contains 2 - 5 times more prorenin than renin
- D. None of the above

1385 Which of the following is not a primary stimuli for renin secretion ?

Harrison's 18th Ed. 2044

- A. Decreased NaCl transport in thick ascending limb of loop of Henle
- B. Increased NaCl transport in thick ascending limb of loop of Henle
- C. Decreased pressure or stretch within renal afferent arteriole
- D. Sympathetic nervous system stimulation of renin-secreting cells via β_1 adrenoreceptors

Three primary stimuli for renin secretion are decreased NaCl transport in thick ascending limb of loop of Henle (macula densa mechanism), decreased pressure or stretch within renal afferent arteriole (baroreceptor mechanism), and sympathetic nervous system stimulation of renin-secreting cells via β_1 adrenoreceptors. Renin secretion is inhibited by increased NaCl transport in thick ascending limb of loop of Henle.

1386 Which of the following directly inhibits renin secretion ?

Harrison's 18th Ed. 2044

- A. Angiotensin I
- B. Angiotensin II
- C. Prorenin
- D. All of the above

Angiotensin II directly inhibits renin secretion due to angiotensin II type 1 receptors on juxtaglomerular cells. Renin secretion increases in response to pharmacologic blockade of either ACE or angiotensin II receptors.

1387 Which of the following statements is false ?

Harrison's 18th Ed. 2044

- A. Angiotensin I is an inactive decapeptide
- B. Angiotensin I is an active octapeptide
- C. ACE-kininase II is located in pulmonary circulation
- D. ACE-kininase II activates bradykinin

In circulation, active renin cleaves angiotensinogen to form an inactive decapeptide, angiotensin I. ACE-kininase II is a converting enzyme, located primarily in pulmonary circulation, converts angiotensin I to active octapeptide, angiotensin II. It also inactivates vasodilator bradykinin.

1388 Which of the following statements is false about angiotensin II ?

Harrison's 18th Ed. 2044

- A. Acts on angiotensin II type 1 receptors on cell membranes
- B. Potent pressor substance
- C. Stimulates secretion of aldosterone
- D. None of the above

1389 Which of the following is a functional effect of angiotensin II type 2 receptor (AT₂) ?

Harrison's 18th Ed. 2044

- A. Vasodilation
- B. Sodium excretion
- C. Inhibition of cell growth & matrix formation
- D. All of the above

Angiotensin II type 2 (AT₂) receptor is widely distributed in kidneys and has the opposite functional effects of AT₁ receptor. AT₂ receptor induces vasodilation, sodium excretion and inhibition of cell growth and matrix formation.

1390 Which of the following is a renin-secreting tumor ?

Harrison's 18th Ed. 2044

- A. Germinoma
- B. Benign hemangiopericytoma
- C. Choriocarcinoma
- D. Osteoblastoma

Renin-secreting tumors include benign hemangiopericytomas of the juxtaglomerular apparatus, renal carcinomas & Wilms' tumors.

1391 Renin-producing carcinomas may be found in ?

Harrison's 18th Ed. 2044

- A. Lung
- B. Liver
- C. Pancreas
- D. All of the above

Renin-producing carcinomas have been described in lung, liver, pancreas, colon and adrenals.

1392 Angiotensinogen, renin, and angiotensin II are also synthesized locally in ?

Harrison's 18th Ed. 2045

- A. Uterus
- B. Brain
- C. Spleen
- D. All of the above

Angiotensinogen, renin, and angiotensin II are also synthesized locally in brain, pituitary, aorta, arteries, heart, adrenal glands, kidneys, adipocytes, leukocytes, ovaries, testes, uterus, spleen, and skin.

1393 Angiotensin II in tissues may be formed by the enzymatic activity of ?

Harrison's 18th Ed. 2045

- A. Tonin
- B. Chymase
- C. Cathepsins
- D. All of the above

Angiotensin II in tissues may be formed by the enzymatic activity of renin or by other proteases like tonin, chymase, and cathepsins.

1394 Which of the following is the primary trophic factor regulating synthesis & secretion of aldosterone by zona glomerulosa of adrenal cortex ?

Harrison's 18th Ed. 2045

- A. Potassium
- B. Adrenocorticotrophic hormone (ACTH)
- C. Angiotensin II
- D. All of the above

Angiotensin II is the primary trophic factor regulating synthesis & secretion of aldosterone by zona glomerulosa of adrenal cortex. Aldosterone synthesis is also dependent on potassium and acute elevations of adrenocorticotrophic hormone (ACTH).

1395 Mineralocorticoid receptors are expressed in which of the following ?

Harrison's 18th Ed. 2045

- A. Colon
- B. Salivary glands
- C. Sweat glands
- D. All of the above

Mineralocorticoid receptors also are expressed in the colon, salivary glands, and sweat glands.

1396 Which of the following has no affinity for the mineralocorticoid receptor ?

Harrison's 18th Ed. 2045

- A. Aldosterone
- B. Cortisol
- C. Cortisone
- D. All of the above

Aldosterone is a potent mineralocorticoid that increases sodium reabsorption by amiloride-sensitive epithelial sodium channels (ENaC) on the apical surface of the principal cells of the renal cortical collecting duct. Cortisol also binds to mineralocorticoid receptors but is a less potent mineralocorticoid than aldosterone because cortisol is converted to cortisone by the enzyme 11 β -hydroxysteroid dehydrogenase type 2. Cortisone has no affinity for the mineralocorticoid receptor.

1397 Myocardial fibrosis, nephrosclerosis, vascular inflammation and remodeling are the effects of which of the following ?

Harrison's 18th Ed. 2045

- A. Aldosterone
- B. Cortisol

- C. Cortisone
- D. All of the above

Aldosterone and/or mineralocorticoid receptor activation induces structural & functional alterations in heart, kidney & blood vessels, leading to myocardial fibrosis, nephrosclerosis & vascular inflammation and remodeling, as a consequence of oxidative stress. These effects are amplified by a high salt intake.

1398 In CHF, low-dose spironolactone reduces the risk of progressive heart failure and sudden death from cardiac causes by ?

Harrison's 18th Ed. 2045

- A. 10 %
- B. 20 %
- C. 30 %
- D. 40 %

In CHF, low-dose spironolactone reduces the risk of progressive heart failure and sudden death from cardiac causes by 30%

1399 Intracellular pH (pH_i) is regulated by ?

Harrison's 18th Ed. 2045

- A. Na⁺ - H⁺ exchange
- B. Na⁺ - dependent HCO₃⁻ - Cl⁻ exchange
- C. Cation-independent HCO₃⁻ - Cl⁻ exchange
- D. All of the above

Intracellular pH (pH_i) of vascular smooth muscle cells determine vascular tone and vascular growth. Ion transport mechanisms that regulate pH_i include Na⁺-H⁺ exchange, Na⁺-dependent HCO₃⁻-Cl⁻ exchange and cation-independent HCO₃⁻-Cl⁻ exchange.

1400 Which of the following is increased in hypertension ?

Harrison's 18th Ed. 2045

- A. Sympathetic outflow
- B. Activity of the Na⁺ - H⁺ exchanger
- C. Atrial natriuretic factor
- D. All of the above

1401 Which of the following is synthesized in adrenal medulla and released into circulation upon adrenal stimulation ?

Harrison's 17th Ed. 1550

- A. Epinephrine
- B. Norepinephrine
- C. Dopamine
- D. All of the above

Adrenergic neurons synthesize norepinephrine & dopamine, which are stored in vesicles within neuron. When neuron is stimulated, these neurotransmitters are released into synaptic cleft. Epinephrine is synthesized in adrenal medulla & released into circulation upon adrenal stimulation.

1402 Atherosclerotic, hypertension-related vascular lesions in the kidney primarily affect ?

Harrison's 18th Ed. 2046

- A. Preglomerular arterioles
- B. Glomerular capillaries
- C. Postglomerular arterioles
- D. All of the above

Atherosclerotic, hypertension-related vascular lesions in the kidney primarily affect preglomerular arterioles, resulting in ischemic changes in the glomeruli and postglomerular structures.

1403 Renal lesion associated with malignant hypertension is ?

Harrison's 18th Ed. 2046

- A. Fibrinoid necrosis of afferent arterioles

- B. Fibrinoid necrosis of glomerular capillaries
- C. Fibrinoid necrosis of efferent arterioles
- D. All of the above

Renal lesion associated with malignant hypertension consists of fibrinoid necrosis of the afferent arterioles.

1404 For every 20-mm Hg increase in SBP & 10-mm Hg increase in DBP, cardiovascular disease risk increases by ?

Harrison's 18th Ed. 2047

- A. 1.5 times
- B. 2 times
- C. 2.5 times
- D. 3 times

Cardiovascular disease risk doubles for every 20 mm Hg increase in systolic and 10 mm Hg increase in diastolic pressure.

1405 Among older individuals, which of the following is the least powerful predictor of cardiovascular disease ?

Harrison's 18th Ed. 2047

- A. Systolic blood pressure
- B. Diastolic blood pressure
- C. Pulse pressure
- D. None of the above

Among older individuals, systolic blood pressure & pulse pressure are more powerful predictors of cardiovascular disease than diastolic blood pressure.

1406 Blood pressure tends to be higher during which of the following times ?

Harrison's 18th Ed. 2047

- A. Early morning hours soon after waking
- B. Following meals
- C. Evenings
- D. Night

Blood pressure tends to be higher in the early morning hours, soon after waking, than at other times of day. Myocardial infarction and stroke are more frequent in the early morning hours.

1407 Generally, night time blood pressures are lower than day time blood pressures by ?

Harrison's 18th Ed. 2047

- A. 5 - 10 %
- B. 10 - 20 %
- C. 20 - 30 %
- D. 30 - 40 %

Nighttime blood pressures are generally 10 - 20% lower than daytime blood pressures.

1408 Which of the following about hypertension is false ?

Harrison's 18th Ed. 2047

- A. More severe in glomerular than in interstitial diseases
- B. Low-renin patients have volume-dependent hypertension
- C. White coat hypertension does not develop into sustained hypertension
- D. ~80 - 95% of hypertensive patients have "essential" hypertension

Individuals with white coat hypertension are at increased risk for developing sustained hypertension.

1409 Which is the most common histologic variant of fibromuscular dysplasia ?

Harrison's 18th Ed. 2049

- A. Medial fibroplasia
- B. Perimedial fibroplasia
- C. Medial hyperplasia
- D. Intimal fibroplasia

Histologic variants of fibromuscular dysplasia include medial fibroplasia, perimedial fibroplasia, medial hyperplasia & intimal fibroplasia. Medial fibroplasia is the most common variant (66%).

1410 Lesions of fibromuscular dysplasia mostly affect which portion of renal artery ?

Harrison's 18th Ed. 2049

- A. Proximal
- B. Mid
- C. Distal
- D. Any of the above

Lesions of fibromuscular dysplasia are frequently bilateral and in contrast to atherosclerotic renovascular disease tend to affect more distal portions of renal artery.

1411 Which of the following serves as "gold standard" for evaluation and identification of renal artery lesions ?

Harrison's 18th Ed. 2049

- A. DTPA scan
- B. Gadolinium-contrast magnetic resonance angiography
- C. Contrast arteriography
- D. Doppler ultrasound of the renal arteries

Contrast arteriography remains the "gold standard" for evaluation and identification of renal artery lesions.

1412 In renal artery obstruction, functionally significant lesions occlude ?

Harrison's 18th Ed. 2049

- A. > 30 % of the lumen
- B. > 50 % of the lumen
- C. > 70 % of the lumen
- D. > 90 % of the lumen

Functionally significant renal artery lesions generally occlude more than 70% of the lumen of the affected renal artery.

1413 Which of the following is not a feature of primary aldosteronism ?

Harrison's 18th Ed. 2049

- A. Sodium retention
- B. Hypertension
- C. Hypokalemia
- D. High PRA

Excess aldosterone production in primary aldosteronism is independent of the renin-angiotensin system and leads to sodium retention, hypertension, hypokalemia, and low PRA.

1414 Hypokalemic hypertension is seen in ?

Harrison's 18th Ed. 2049

- A. Primary aldosteronism
- B. Glucocorticoid-induced hypertension
- C. Pheochromocytoma
- D. All of the above

Besides primary aldosteronism, hypokalemic hypertension may be a consequence of secondary aldosteronism, other mineralocorticoid- and glucocorticoid-induced hypertensive disorders, and pheochromocytoma.

1415 Plasma aldosterone (adult) level in supine position with patient on normal sodium diet normally is ?

Harrison's 18th Ed., Appendix: Laboratory Values of Clinical Importance, Table 2

- A. < 16 ng/dL
- B. < 32 ng/dL
- C. < 48 ng/dL
- D. < 72 ng/dL

1416 Plasma aldosterone is suppressed by all except ?

Harrison's 18th Ed. 2050

- A. Oral NaCl load
- B. Fludrocortisone
- C. Captopril
- D. Spironolactone

Aldosterone antagonists, angiotensin receptor antagonists, and ACE inhibitors may increase renin. Aldosterone antagonists may increase aldosterone. IV infusion of isotonic saline, oral NaCl load, fludrocortisone, or captopril suppress aldosterone.

1417 Which of the following is false about aldosterone-producing adrenal adenoma ?

Harrison's 18th Ed. 2050

- A. Tumor is almost always unilateral
- B. Measures < 3 cm. in diameter
- C. Aldosterone biosynthesis more responsive to ACTH
- D. None of the above

1418 In which of the following conditions, males may present with pseudohermaphroditism and hypertension ?

Harrison's 18th Ed. 2051, Table 247-4

- A. Glucocorticoid-remediable hyperaldosteronism
- B. 11 β -hydroxylase deficiency
- C. 17 α -hydroxylase deficiency
- D. 11 β -hydroxysteroid dehydrogenase deficiency

With 17 α -hydroxylase deficiency, synthesis of sex hormones & cortisol is decreased. Consequently, these individuals do not mature sexually. Males may present with pseudohermaphroditism and females with primary amenorrhea and absent secondary sexual characteristics. Because cortisol-induced negative feedback on pituitary ACTH production is diminished, ACTH-stimulated adrenal steroid synthesis proximal to the enzymatic block is increased. Hypertension and hypokalemia are consequences of increased synthesis of mineralocorticoids proximal to the enzymatic block, particularly desoxycorticosterone. Increased steroid production and, hence, hypertension may be treated with low-dose glucocorticoids.

1419 "Hypertensive headache" occurs during ?

Harrison's 18th Ed. 2053

- A. Morning
- B. Afternoon
- C. Evening
- D. Night

1420 "Hypertensive headache" is localized to ?

Harrison's 18th Ed. 2053

- A. Occipital region
- B. Frontal region
- C. Temporal region
- D. Any of the above

Characteristically, hypertensive headache occurs in morning & is localized to occipital region.

1421 Width of the blood pressure bladder cuff should equal at least what percentage of the arm circumference ?

Harrison's 18th Ed. 2053

- A. 10 %
- B. 20 %
- C. 30 %
- D. 40 %

1422 Length of blood pressure bladder cuff bladder should encircle at least what percentage of the arm circumference ?

Harrison's 18th Ed. 2053

- A. 20 %
- B. 40 %
- C. 60 %
- D. 80 %

Width of the blood pressure bladder cuff should equal at least 40% of the arm circumference; the length of the cuff bladder should encircle at least 80% of the arm circumference.

1423 Blunting of the day-night blood pressure pattern occurs in ?

Harrison's 17th Ed. 1553

- A. Sleep apnea
- B. Autonomic neuropathy
- C. African Americans populations
- D. All of the above

Attenuated nighttime blood pressure "dip" is associated with increased cardiovascular disease risk. Blunting of day-night blood pressure pattern occurs in sleep apnea, autonomic neuropathy & in African Americans.

1424 One standard drink contains how many grams of ethanol ?

Harrison's 18th Ed. 2054

- A. ~ 10 grams
- B. ~ 14 grams
- C. ~ 18 grams
- D. ~ 24 grams

One standard drink contains ~14 grams of ethanol.

1425 DASH trial stands for ?

Harrison's 18th Ed. 2054, Table 247-7

- A. Death and survival in hypertension
- B. Diastolic and systolic hypertension
- C. Dietary approaches to stop hypertension
- D. Duration and severity of hypertension

DASH (Dietary Approaches to Stop Hypertension) trial.

1426 Supplementation of which of the following may be associated with reduced stroke mortality ?

Harrison's 18th Ed. 2054

- A. Potassium
- B. Calcium
- C. Sodium
- D. Alcohol

Potassium supplementation may be associated with reduced stroke mortality.

1427 Which of the following act by inhibiting epithelial sodium channels in the distal nephron ?

Harrison's 18th Ed. 2054

- A. Thiazides

- B. Furosemide
- C. Eplerenone
- D. Amiloride

Potassium-sparing diuretics, amiloride and triamterene, act by inhibiting epithelial sodium channels in the distal nephron. Thiazides inhibit the Na⁺/Cl⁻ pump in the distal convoluted tubule and hence increase sodium excretion. Loop diuretics inhibit the Na⁺-K⁺-2Cl⁻ cotransporter in the thick ascending limb of the loop of Henle. Eplerenone is an aldosterone antagonist.

1428 Angiotensin-converting enzyme inhibitors act by which of the following mechanism ?

Harrison's 18th Ed. 2056

- A. Decrease production of angiotensin II
- B. Increase bradykinin levels
- C. Reduce sympathetic nervous system activity
- D. All of the above

ACEIs decrease the production of angiotensin II, increase bradykinin levels, and reduce sympathetic nervous system activity.

1429 Angiotensin receptor blockers (ARB) provide selective blockade of ?

Harrison's 18th Ed. 2056

- A. AT₁ receptors
- B. AT₂ receptors
- C. AT₃ receptors
- D. AT₄ receptors

ARBs provide selective blockade of AT₁ receptors, and the effect of angiotensin II on unblocked AT₂ receptors may augment their hypotensive effect.

1430 Which of the following diminishes the adverse effects of diuretics on glucose metabolism ?

Harrison's 18th Ed. 2056

- A. ACEIs and ARBs
- B. Beta blockers
- C. Calcium antagonists
- D. Alpha antagonists

ACEIs and ARBs improve insulin action and ameliorate the adverse effects of diuretics on glucose metabolism.

1431 Which of the following reduces the risk of developing diabetes in high-risk hypertensive patients

Harrison's 18th Ed. 2056

- A. Valsartan
- B. Lisinopril
- C. Captopril
- D. Ramipril

Valsartan (an ARB) reduces the risk of developing diabetes in high-risk hypertensive patients.

1432 Which of the following is a direct renin inhibitor ?

Harrison's 18th Ed. 2056

- A. Guanfacine
- B. Doxazosin
- C. Aliskiren
- D. Terazosin

Aliskiren is an oral, nonpeptide competitive inhibitors of the enzymatic activity of renin.

1433 Which of the following about spironolactone is false ?

Harrison's 18th Ed. 2056

- A. Nonselective aldosterone antagonist
- B. Binds to progesterone
- C. Binds to androgen receptors
- D. None of the above

1434 Spironolactone is effective in patients with ?

Harrison's 18th Ed. 2056

- A. Low-renin essential hypertension
- B. Resistant hypertension
- C. Primary aldosteronism
- D. All of the above

Spironolactone is a nonselective aldosterone antagonist that may be used alone or in combination with a thiazide diuretic. It is particularly effective agent in patients with low-renin essential hypertension, resistant hypertension, and primary aldosteronism. Because spironolactone binds to progesterone and androgen receptors, side effects may include gynecomastia, impotence, and menstrual abnormalities.

1435 Which of the following is a selective aldosterone antagonist ?

Harrison's 18th Ed. 2056

- A. Aliskiren
- B. Eplerenone
- C. Candesartan
- D. Minoxidil

Eplerenone is a selective aldosterone antagonist.

1436 Which of the following blocks both β receptors and peripheral α -adrenergic receptors ?

Harrison's 18th Ed. 2056

- A. Carvedilol
- B. Aliskiren
- C. Eplerenone
- D. Minoxidil

Carvedilol and labetalol block both β receptors and peripheral α -adrenergic receptors.

1437 Selective alpha antagonists include all except ?

Harrison's 18th Ed. 2056

- A. Prazosin
- B. Doxazosin
- C. Terazosin
- D. Phenoxybenzamine

Phenoxybenzamine is a nonselective alpha antagonist.

1438 Calcium antagonists reduce vascular resistance through ?

Harrison's 18th Ed. 2056

- A. K - channel blockade
- B. L - channel blockade
- C. M - channel blockade
- D. N - channel blockade

Calcium antagonists reduce vascular resistance through L-channel blockade, which reduces intracellular calcium and blunts vasoconstriction.

1439 Which of the following is not a class of calcium antagonists ?

Harrison's 18th Ed. 2056

- A. Phenylalkylamines
- B. Phenylpyridines

- C. Benzothiazepines
- D. Dihydropyridines

Calcium antagonists are of three classes - phenylalkylamines (verapamil), benzothiazepines (diltiazem), and 1,4-dihydropyridines (amlodipine, felodipine, isradipine, nicardipine, nifedipine and nisoldipine).

1440 Edema with dihydropyridine calcium channel blockers is due to ?

Harrison's 18th Ed. 2056

- A. Net salt retention
- B. Net water retention
- C. Increase in transcapillary pressure gradients
- D. All of the above

Edema with dihydropyridine use are related to their potencies as arteriolar dilators. Edema is due to an increase in transcapillary pressure gradients, not to net salt and water retention.

1441 Which of the following is true about Hydralazine ?

Harrison's 18th Ed. 2056

- A. Direct vasodilator
- B. Antioxidant
- C. Nitric-oxide enhancer
- D. All of the above

Hydralazine is a potent direct vasodilator that has antioxidant and nitric-oxide enhancing actions.

1442 Which of the following drug is used in patients with renal insufficiency who are refractory to all other drugs ?

Harrison's 18th Ed. 2056

- A. Minoxidil
- B. Aliskiren
- C. Hydralazine
- D. Methyldopa

Minoxidil is used most frequently in patients with renal insufficiency who are refractory to all other drugs.

1443 Patients with high-renin hypertension may be more responsive to which of the following ?

Harrison's 18th Ed. 2057

- A. ACE inhibitors
- B. Beta blockers
- C. Calcium antagonists
- D. Diuretics

1444 Patients with low-renin hypertension are more responsive to which of the following ?

Harrison's 18th Ed. 2057

- A. ACE inhibitors
- B. Beta blockers
- C. Calcium antagonists
- D. Direct vasodilators

Younger patients may be more responsive to beta blockers & ACE inhibitors, whereas patients over age 50 may be more responsive to diuretics & calcium antagonists. Patients with high-renin hypertension may be more responsive to ACE inhibitors & angiotensin receptor blockers, whereas patients with low-renin hypertension are more responsive to diuretics and calcium antagonists.

1445 In HOPE (Heart Outcomes Prevention Evaluation) trial, which of the following ACE inhibitors was studied ?

The American Journal of Medicine 2005;118, 695-705

- A. Lisinopril

- B. Ramipril
- C. Enalapril
- D. Perindopril

1446 In ALLHAT (Antihypertensive and Lipid-Lowering Treatment to Prevent Heart Attack Trial), which of the following ACE inhibitors was studied ?

The American Journal of Medicine 2005;118, 695-705

- A. Lisinopril
- B. Ramipril
- C. Enalapril
- D. Perindopril

1447 Which of the following drug has renal protective effects ?

Harrison's 18th Ed. 2057

- A. Aliskiren
- B. ACE Inhibitors
- C. ARBs
- D. All of the above

In hypertension & diabetes, renal protection with aliskiren is comparable to that with ACEIs & ARBs.

1448 Better stroke protection is provided by ?

Harrison's 18th Ed. 2057

- A. ACE inhibitors
- B. Beta blockers
- C. Calcium channel blockers
- D. All of the above

ACE inhibitors provide better coronary protection than calcium channel blockers, whereas calcium channel blockers provide more stroke protection than either ACE inhibitors or beta blockers.

1449 If the radial pulse remains palpable despite occlusion of the brachial artery by the cuff, the maneuver is called ?

Harrison's 18th Ed. 2058

- A. Roger maneuver
- B. Osler maneuver
- C. Happit maneuver
- D. Weber maneuver

Osler maneuver refers to the radial pulse that remains palpable despite occlusion of the brachial artery by the cuff.

1450 Resistant hypertension refers to BP persistently above what level despite taking 3 or more antihypertensives, including a diuretic, in reasonable combination and at full doses ?

Harrison's 18th Ed. 2058

- A. >130/90 mmHg
- B. >140/90 mmHg
- C. >150/90 mmHg
- D. >160/90 mmHg

Resistant hypertension refers to patients with BP persistently >140/90 mmHg despite taking three or more antihypertensive agents, including a diuretic, in reasonable combination & at full doses.

1451 "Pseudoresistance" refers to ?

Harrison's 18th Ed. 2058

- A. Lower office and High home blood pressures
- B. High office and lower home blood pressures

- C. Higher office and High home blood pressures
- D. Lower office and low home blood pressures

"Pseudoresistance" refers to high office blood pressures & lower home blood pressures.

1452 Which of the following is most important in malignant hypertension ?

Harrison's 18th Ed. 2058

- A. Underlying hypertension
- B. Absolute level of blood pressure
- C. Rate of rise of blood pressure
- D. Response to treatment

In malignant hypertension, absolute level of blood pressure is not as important as its rate of rise.

1453 Which of the following occurs pathologically in malignant hypertension ?

Harrison's 18th Ed. 2058

- A. Diffuse necrotizing vasculitis
- B. Arteriolar thrombi
- C. Fibrin deposition in arteriolar walls
- D. All of the above

Pathologically, malignant hypertension is associated with diffuse necrotizing vasculitis, arteriolar thrombi, and fibrin deposition in arteriolar walls.

1454 Malignant hypertension is associated with ?

Harrison's 18th Ed. 2058

- A. Progressive retinopathy
- B. Microangiopathic hemolytic anemia
- C. Encephalopathy
- D. All of the above

Clinically, in malignant hypertension, there occurs progressive retinopathy (arteriolar spasm, hemorrhages, exudates, and papilledema), deteriorating renal function with proteinuria, microangiopathic hemolytic anemia, and encephalopathy.

1455 In malignant hypertension, the initial goal of therapy is to reduce mean arterial blood pressure by no more than ?

Harrison's 18th Ed. 2059

- A. 10 %
- B. 25 %
- C. 40 %
- D. 60 %

In malignant hypertension, the initial goal of therapy is to reduce mean arterial blood pressure by no more than 25% within minutes to 2 hours or to a blood pressure in the range of 160/100 - 110 mmHg.

1456 Esmolol is the preferred parenteral drug for ?

Harrison's 18th Ed. 2058, Table 247-9

- A. Aortic dissection
- B. Preeclampsia/eclampsia of pregnancy
- C. Stroke
- D. Adrenergic crisis

1457 Which of the following drug is contraindicated in pregnancy ?

Harrison's 18th Ed. 2055, Table 247-8

- A. Captopril
- B. Losartan
- C. Aliskiren
- D. All of the above

1458 Which of the following antihypertensive agents is given as "IV bolus" in hypertensive emergencies ?

Harrison's 18th Ed. 2058, Table 247-10

- A. Hydralazine
- B. Esmolol
- C. Phentolamine
- D. Labetalol

1459 Preferred parenteral drug for hypertensive emergency during preeclampsia / eclampsia of pregnancy is ?

Harrison's 18th Ed. 2058, Table 247-9

- A. Hydralazine
- B. Labetalol
- C. Nicardipine
- D. All of the above

1460 Risk factors for preeclampsia include all except ?

Harrison's 16th Ed. 32

- A. Nulliparity
- B. Diabetes mellitus
- C. Anemia
- D. Obesity

1461 Risk factors for preeclampsia include all except ?

Harrison's 16th Ed. 32

- A. Factor V Leiden mutation
- B. Angiotensinogen gene T235
- C. Antiphospholipid antibody syndrome
- D. Smoking

1462 Medications or substances that can raise blood pressure or antagonize effects of antihypertensive drugs include all except ?

N Engl J Med 2006;355:385-92

- A. Ginseng
- B. Anabolic steroids
- C. Erythropoietin
- D. Chloroquine

1463 Medications or substances that can raise blood pressure or antagonize effects of antihypertensive drugs include all except ?

N Engl J Med 2006;355:385-92

- A. Nonsteroidal antiinflammatory drugs
- B. Excessive alcohol use
- C. High sodium intake
- D. Appetite stimulants

1464 High sodium intake is defined by ?

N Engl J Med 2006;355:385-92

- A. Urinary sodium excretion of >50 mmol per day
- B. Urinary sodium excretion of >100 mmol per day
- C. Urinary sodium excretion of >150 mmol per day
- D. None of the above

1465 Frequency of salt sensitivity is increased among ?

N Engl J Med 2006;355:385-92

- A. > 60 years of age

- B. Black or obese
- C. Renal impairment
- D. All of the above

1466 Which of the following suggest a diagnosis of atherosclerotic renovascular disease ?

N Engl J Med 2006;355:385-92

- A. Abdominal bruit
- B. Hypokalemia
- C. Recent increase in severity of hypertension
- D. All of the above

1467 Which of the following suggest aldosteronism as cause of secondary hypertension ?

N Engl J Med 2006;355:385-92

- A. Abnormal ratio of aldosterone to renin
- B. Abnormal response to sodium loading
- C. Adrenal adenoma on CT or MRI
- D. All of the above

1468 Which of the following suggest pheochromocytoma as cause of secondary hypertension ?

N Engl J Med 2006;355:385-92

- A. Norepinephrine >80 µg/24 hours
- B. VMA >5 mg/24 hours
- C. Elevated plasma metanephrines
- D. All of the above

1469 To prevent hypertensive crisis, patients taking MAOIs must avoid ?

N Engl J Med 2005;353:1819-34

- A. Phenylalanine diet
- B. Tryptophan diet
- C. Tyramine diet
- D. All of the above

1470 Which of the following is amino acid derived hormone ?

Harrison's 16th Ed. 2067

- A. Dopamine
- B. Catecholamines
- C. Thyroid hormone
- D. All of the above

1471 In hypertension during pregnancy, which of the following drugs would be safest ?

N Engl J Med 1998;338:1131

- A. Labetalol
- B. Beta-adrenergic-receptor antagonists
- C. Prazosin
- D. Calcium channel blocker

1472 If ACE inhibitors are given during pregnancy, what teratogenic effects can happen ?

N Engl J Med 1998;338:1131

- A. Prolonged renal failure in neonates
- B. Decreased skull ossification

- C. Renal tubular dysgenesis
- D. All of the above

1473 If Warfarin is given during pregnancy, what teratogenic effect can happen ?

N Engl J Med 1998;338:1131

- A. Neonatal meconium ileus
- B. Anomalies of teeth and bone
- C. Ebstein's anomaly
- D. Dandy–Walker syndrome

1474 Mothers who took warfarin during 1st trimester could have all of the following congenital malformations in infants except ?

Harrison's 16th Ed. 35

- A. Severe nasal hypoplasia
- B. Stippled epiphyseal calcifications
- C. Agenesis of the corpus callosum
- D. Chiari type I malformation

1475 Which of the following anticoagulants does not cross placenta ?

Harrison's 16th Ed. 680

- A. Warfarin
- B. Anisindione
- C. Heparin
- D. None of the above

1476 Which of the following is a vasoconstrictor ?

Lancet 2005;365:417-430

- A. Norepinephrine
- B. Endothelin
- C. Angiotensin II
- D. All of the above

1477 Hypertensive retinopathy was first described by ?

N Engl J Med 2004;351:2310-7

- A. Marcus Gunn
- B. William Osler
- C. Keith Wegener
- D. Alexander Fleming

1478 Which of the following is called "Age pigment" ?

Heart Lung and Circulation 2005;14:107-114

- A. Calpains
- B. Melanin
- C. Lipofuscin
- D. Bilirubin

Chapter 248. Diseases of the Aorta

1479 In adults, aortic diameter at the origin is approximately ?

Harrison's 18th Ed. 2060

- A. 2 cm
- B. 3 cm
- C. 4 cm
- D. 5 cm

In adults, aortic diameter at the origin is ~3 cm, 2.5 cm in descending portion in thorax, and 1.8 to 2 cm in abdomen.

1480 Aortic wall intima is composed of all except ?

Harrison's 18th Ed. 2060

- A. Endothelium
- B. Subendothelial connective tissue
- C. Internal elastic lamina
- D. Smooth muscle cells

Aortic wall thin intima is composed of endothelium, subendothelial connective tissue, and an internal elastic lamina.

1481 Vasa vasorum and nervi vascularis are located in which of the following structures of aorta ?

Harrison's 18th Ed. 2060

- A. Endothelium
- B. Tunica media
- C. Adventitia
- D. All of the above

Vasa vasorum & nervi vascularis are located in adventitia composed of connective tissue.

1482 Kommerell's diverticulum is an anatomic remnant of ?

Harrison's 18th Ed. 2060

- A. Left umbilical artery
- B. Right aortic arch
- C. Ductus arteriosus
- D. Left atrial appendage

Kommerell's diverticulum is an anatomic remnant of a right aortic arch.

1483 In a pseudoaneurysm, which of the following layers is not disrupted ?

Harrison's 18th Ed. 2060

- A. Intima
- B. Media
- C. Adventitia
- D. None of the above

In pseudoaneurysm, intimal & medial layers are disrupted & dilatation is lined by adventitia only. A true aneurysm involves all three layers of the vessel wall.

1484 A fusiform aneurysm affects what proportion of the circumference of a segment of the vessel ?

Harrison's 18th Ed. 2060

- A. 25 %
- B. 50 %
- C. 75 %
- D. 100 %

A fusiform aneurysm affects the entire circumference of a segment of the vessel, resulting in a diffusely dilated artery. A saccular aneurysm involves only a portion of circumference, resulting in an outpouching of the vessel wall.

1485 Which of the following factors is not associated with degenerative aortic aneurysms ?

Harrison's 18th Ed. 2061

- A. Aging
- B. Alcohol
- C. Cigarette smoking
- D. Hypercholesterolemia

Factors associated with degenerative aortic aneurysms include aging, cigarette smoking, hypercholesterolemia, male sex, and a family history of aortic aneurysms. Most common pathologic condition associated with degenerative aortic aneurysms is atherosclerosis.

- 1486 Cystic medial necrosis affects which component of the aortic wall ?**
Harrison's 18th Ed. 2061
- A. Intima
 - B. Media
 - C. Adventitia
 - D. All of the above

Cystic medial necrosis is a histopathologic term used to describe degeneration of collagen & elastic fibers in tunica media of aorta.

- 1487 Most common pathological condition for ascending aortic aneurysm is ?**
Harrison's 18th Ed. 2061
- A. Hypertension
 - B. Atherosclerosis
 - C. Cystic medial necrosis
 - D. Tuberculosis

Cystic medial necrosis characteristically affects the proximal aorta, leading to circumferential weakness, dilatation and development of fusiform aneurysm.

- 1488 Cystic medial necrosis is prevalent in patients with ?**
Harrison's 18th Ed. 2061
- A. Marfan syndrome
 - B. Ehlers-Danlos syndrome type IV
 - C. Hypertension
 - D. All of the above

Cystic medial necrosis is particularly prevalent in patients with Marfan syndrome, Loeys-Dietz syndrome, Ehlers-Danlos syndrome type IV, hypertension, congenital bicuspid aortic valves, and familial thoracic aortic aneurysm syndromes.

- 1489 Mutations of the gene that encodes fibrillin-1 are present in patients with ?**
Harrison's 18th Ed. 2061
- A. Marfan syndrome
 - B. Ehlers-Danlos syndrome type IV
 - C. Loeys-Dietz syndrome
 - D. Osteogenesis Imperfecta (OI)

Mutations of the gene that encodes fibrillin-1 are present in patients with Marfan syndrome.

- 1490 Loeys-Dietz syndrome is caused by mutations in the genes that encode ?**
Harrison's 18th Ed. 2061
- A. COL5A1
 - B. TNXB
 - C. TGF- β receptors 1 (TGFB1)
 - D. PLOD1

Loeys-Dietz syndrome is due to mutations in genes that encode TGF- β 1 (TGFB1) & 2 (TGFB2).

- 1491 Loeys-Dietz syndrome (LDS) is characterized by all except ?**
- A. Aortic aneurysms
 - B. Hearing loss
 - C. Cleft palate
 - D. Hypertelorism

Loeys-Dietz syndrome (LDS) is characterized by aortic aneurysms, cleft palate & hypertelorism. LDS is related to Marfan Syndrome.

- 1492 Mutations of type III procollagen results in ?**
Harrison's 18th Ed. 2061
- A. Ehlers-Danlos type I syndrome
 - B. Ehlers-Danlos type II syndrome
 - C. Ehlers-Danlos type III syndrome
 - D. Ehlers-Danlos type IV syndrome

Mutations of type III procollagen have been implicated in Ehlers-Danlos type IV syndrome.

- 1493 Syphilitic aneurysms are mostly located in ?**
Harrison's 18th Ed. 2061
- A. Ascending aorta
 - B. Thoracic aorta
 - C. Abdominal aorta
 - D. All of the above

Approximately 90% of syphilitic aneurysms are located in ascending aorta or aortic arch. Syphilis is a relatively uncommon cause of aortic aneurysm.

- 1494 Tuberculous aneurysms are mostly located in ?**
Harrison's 18th Ed. 2061
- A. Ascending aorta
 - B. Thoracic aorta
 - C. Abdominal aorta
 - D. All of the above

Tuberculous aneurysms typically affect thoracic aorta. Direct extension of tubercular infection from hilar lymph nodes or contiguous abscesses or from bacterial seeding resulting granulomatous destruction of medial layer is the pathogenetic mechanism.

- 1495 All of the following conditions can lead to dilatation of the ascending aorta except ?**
Harrison's 18th Ed. 2061
- A. Ankylosing spondylitis
 - B. Rheumatoid arthritis
 - C. Reiter's syndrome
 - D. Behcet's disease

Spondyloarthropathies like ankylosing spondylitis, rheumatoid arthritis, psoriatic arthritis, relapsing polychondritis and Reiter's syndrome are associated with dilatation of the ascending aorta while Behcet's disease and Cogan's syndrome cause thoracic and abdominal aortic aneurysms.

- 1496 Most common pathological condition associated with aneurysms of aortic arch & descending thoracic aorta is ?**
Harrison's 18th Ed. 2061
- A. Hypertension
 - B. Atherosclerosis
 - C. Cystic medial necrosis
 - D. Tuberculosis

Atherosclerosis is the most frequent cause of aneurysms of aortic arch & descending thoracic aorta.

- 1497 Most common pathological condition for distal abdominal aortic aneurysm below renal arteries is ?**
Harrison's 18th Ed. 2062
- A. Hypertension
 - B. Atherosclerosis
 - C. Cystic medial necrosis

D. Tuberculosis

At least 90% of all abdominal aortic aneurysms >4.0 cm are affected by atherosclerosis, and most of these aneurysms are below the level of the renal arteries.

1498 What percentage of atherosclerotic aneurysms are located in distal abdominal aorta, below the renal arteries ?

Harrison's 17th Ed. 1563

- A. 25 %
- B. 33 %
- C. 50 %
- D. 75 %

75 % of atherosclerotic aneurysms are located in distal abdominal aorta, below the renal arteries.

1499 For descending thoracic aneurysms, risk of rupture increases substantially beyond ?

Harrison's 16th Ed. 1482

- A. > 4 cm
- B. > 5 cm
- C. > 6 cm
- D. > 7 cm

Risk of rupture increases substantially for ascending aortic aneurysms >6 cm and descending thoracic aneurysms >7 cm.

1500 Aortic dissection commonly occurs at ?

Harrison's 18th Ed. 2063

- A. Right lateral wall of ascending aorta
- B. Left lateral wall of ascending aorta
- C. Right lateral wall of thoracic descending aorta
- D. Right lateral wall of thoracic descending aorta

Aortic dissection is caused by a circumferential or, less frequently, transverse tear of the intima. It often occurs along the right lateral wall of the ascending aorta where the hydraulic shear stress is high. Another common site is the descending thoracic aorta just below the ligamentum arteriosum.

1501 Stanford & DeBakey classifications are used to classify ?

Harrison's 18th Ed. 2063

- A. Peripheral vascular disease
- B. Aortic dissection
- C. Renal artery stenosis
- D. Internal carotid artery lesions

1502 Incidence of aortic dissection is increased during which of the following period of pregnancy ?

Harrison's 18th Ed. 2063

- A. Second trimester of pregnancy
- B. Third trimester of pregnancy
- C. Intrapartum period
- D. Post partum period

Incidence of aortic dissection is increased in normal women during 3rd trimester of pregnancy.

1503 Which of the following about aortic dissection is false ?

Harrison's 18th Ed. 2063

- A. Peak incidence is in sixth & seventh decades
- B. Men are more affected than women
- C. Acute aortic regurgitation is common
- D. None of the above

1504 Which of the following drugs should be avoided while managing hypertension in acute aortic dissection ?

Harrison's 18th Ed. 2064

- A. Beta adrenergic blockers
- B. Sodium nitroprusside
- C. Diazoxide
- D. Diltiazem

1505 Which of the following drugs should be avoided while managing hypertension in acute aortic dissection ?

Harrison's 18th Ed. 2064

- A. Labetalol
- B. Sodium nitroprusside
- C. Hydralazine
- D. Verapamil

For acute dissection, parenteral beta-adrenergic blockers (IV propranolol, metoprolol, labetalol or esmolol) should be administered to achieve a heart rate of ~60 beats/min. Sodium nitroprusside infusion is used to lower SBP to <120 mmHg. Verapamil, diltiazem or enalaprilat may be used parenterally. Isolated use of direct vasodilators like diazoxide and hydralazine is contraindicated because these agents can increase hydraulic shear and may propagate dissection.

Chapter 249. Vascular Diseases of the Extremities

1506 In patients with peripheral arterial disease, the ankle:brachial index (ABI) is ?

Harrison's 18th Ed. 2067

- A. < 0.4
- B. < 0.6
- C. < 0.8
- D. < 1

In hemodynamically significant arterial stenoses, systolic blood pressure in leg is decreased. Ratio of ankle and brachial artery pressures (ankle:brachial index or ABI) is >=1.0 in normal individuals and <1.0 in patients with peripheral arterial disease; a ratio of <0.5 is consistent with severe ischemia.

1507 "String of beads" appearance on angiography is characteristic of ?

Harrison's 18th Ed. 2069

- A. Fibromuscular dysplasia
- B. Thromboangiitis obliterans
- C. Takayasu's arteritis
- D. Giant cell (temporal) arteritis

"String of beads" appearance on angiography is characteristic of fibromuscular dysplasia caused by thickened fibromuscular ridges contiguous with thin, less-involved portions of the arterial wall.

1508 Clinical features of thromboangiitis obliterans include ?

Harrison's 18th Ed. 2069

- A. Claudication of affected extremity
- B. Raynaud's phenomenon
- C. Migratory superficial vein thrombophlebitis
- D. All of the above

Clinical features of thromboangiitis obliterans include a triad of claudication of the affected extremity, Raynaud's phenomenon, and migratory superficial vein thrombophlebitis.

1509 In lower extremities, emboli lodge most frequently in ?

Harrison's 18th Ed. 2069

- A. Femoral artery

- B. Iliac artery
- C. Popliteal artery
- D. Tibioperoneal arteries

In lower extremities, emboli lodge most frequently in femoral artery, followed by iliac artery, aorta, and popliteal and tibioperoneal arteries.

1510 "Blue toe" syndrome is best related to ?

Harrison's 18th Ed. 2070

- A. Frostbite
- B. Raynaud's phenomenon
- C. Atheroembolism
- D. Arteriovenous Fistula

Atheroembolism causes cyanotic discoloration & impending necrosis of the toes termed as "blue toe syndrome".

1511 Paget-Schroetter syndrome is best related to ?

Harrison's 18th Ed. 2070

- A. Frostbite
- B. Thoracic Outlet Compression Syndrome
- C. Atheroembolism
- D. Arteriovenous Fistula

Thoracic outlet compression syndrome may be divided into arterial, venous & neurogenic forms. Patients with neurogenic thoracic outlet compression may develop shoulder & arm pain, weakness, & paresthesias. Patients with arterial compression experience claudication, Raynaud's phenomenon, ischemic tissue loss & gangrene. Venous compression causes thrombosis of subclavian & axillary veins, often associated with effort & is referred to as Paget-Schroetter syndrome.

1512 Which of the following maneuvers is useful in diagnosis of thoracic outlet compression syndrome ?

Harrison's 18th Ed. 2070-71

- A. Hyperabduction maneuver
- B. Scalene maneuver
- C. Costoclavicular maneuver
- D. All of the above

Maneuvers used for diagnosis of thoracic outlet compression syndrome include abduction & external rotation test, in which affected arm is abducted by 90° & shoulder is externally rotated. Scalene maneuver (extension of neck & rotation of head to side of symptoms). Costoclavicular maneuver (posterior rotation of shoulders) & hyperabduction maneuver (raising arm to 180°).

1513 Nicoladoni-Branham sign refers to ?

Harrison's 18th Ed. 2071

- A. Tenderness in supraclavicular fossa
- B. Compression of large arteriovenous fistula causing reflex slowing of heart rate
- C. Hyperabduction maneuver causing subclavian bruits
- D. Hyperabduction maneuver causing loss of pulses in arm

Compression of a large arteriovenous fistula may cause reflex slowing of the heart rate. This is called Nicoladoni-Branham sign.

1514 On cold exposure, which of the following is the first to occur in Raynaud's phenomenon ?

Harrison's 18th Ed. 2071

- A. Pallor
- B. Cyanosis
- C. Rubor
- D. None of the above

Raynaud's phenomenon is characterized by episodic digital ischemia, manifested clinically by sequential development of digital blanching or pallor, cyanosis, & rubor of fingers or toes following cold exposure & subsequent rewarming.

1515 In Raynaud's phenomenon, patients experience throbbing pain during which phase ?

Harrison's 18th Ed. 2071

- A. Pallor
- B. Cyanosis
- C. Rubor
- D. None of the above

Blanching or pallor represents the ischemic phase of Raynaud's phenomenon and results from vasospasm of digital arteries. During ischemic phase, capillaries & venules dilate and cyanosis results from deoxygenated blood that is present in these vessels. A sensation of cold or numbness or paresthesia of the digits often accompanies the phases of pallor and cyanosis. With rewarming, the digital vasospasm resolves, and blood flow into the dilated arterioles and capillaries increases dramatically. This "reactive hyperemia" imparts a bright red color to the digits. In addition to rubor and warmth, patients often experience a throbbing, painful sensation during the hyperemic phase.

1516 Which of the following about Raynaud's disease is false ?

Harrison's 18th Ed. 2071

- A. 50% with Raynaud's phenomenon have Raynaud's disease
- B. Women are affected 5 times more than men
- C. Age of presentation is between 20 and 40 years
- D. Toes are involved more frequently than fingers

Over 50% of patients with Raynaud's phenomenon have Raynaud's disease. Women are affected about five times more often than men, and the age of presentation is usually between 20 and 40 years. Fingers are involved more frequently than the toes.

1517 Which of the following about Raynaud's phenomenon is false ?

Harrison's 18th Ed. 2071

- A. Occurs frequently in patients who also have migraine
- B. Occurs frequently in patients who also have variant angina
- C. Radial, ulnar and pedal pulses are abnormal
- D. Fingers and toes perspire excessively between attacks

Raynaud's phenomenon occurs frequently in patients who also have migraine headaches or variant angina. Radial, ulnar, and pedal pulses are normal. The fingers and toes may be cool between attacks and may perspire excessively.

1518 Which of the following drugs does not cause Raynaud's phenomenon ?

Harrison's 18th Ed. 2072

- A. Methysergide
- B. α -adrenergic receptor antagonists
- C. β -adrenergic receptor antagonists
- D. None of the above

1519 Which of the following drugs cause Raynaud's phenomenon ?

Harrison's 18th Ed. 2072, Table 249-1

- A. Bleomycin
- B. Vinblastine
- C. Cisplatin
- D. All of the above

Drugs that can cause Raynaud's phenomenon include ergot derivatives, methysergide, beta-adrenergic receptor blockers, bleomycin, vinblastine and cisplatin.

1520 Which of the following diseases can present as Raynaud's phenomenon ?

Harrison's 18th Ed. 2072

- A. Scleroderma
- B. Systemic lupus erythematosus
- C. Dermatomyositis or polymyositis

D. All of the above

Raynaud's phenomenon occurs in patients with systemic sclerosis (scleroderma), systemic lupus erythematosus (SLE), dermatomyositis or polymyositis, rheumatoid arthritis, atherosclerosis of extremities, thromboangiitis obliterans, acute occlusion of large and medium-sized arteries by a thrombus or embolus, thoracic outlet compression syndrome, primary pulmonary hypertension, blood dyscrasias, use of vibrating hand tools, pianists and keyboard operators. Electric shock injury to the hands or frostbite may lead to the later development of Raynaud's phenomenon.

- 1521 Which of the following drug is useful in Raynaud's phenomenon ?
Harrison's 18th Ed. 2072
- A. Nifedipine
 - B. Prazosin
 - C. Methyldopa
 - D. All of the above

- 1522 Which of the following drug is useful in Raynaud's phenomenon ?
Harrison's 18th Ed. 2072
- A. Amlodipine
 - B. Terazosin
 - C. Phenoxybenzamine
 - D. All of the above

Dihydropyridine calcium channel antagonists (nifedipine, isradipine, felodipine & amlodipine) are useful. Postsynaptic alpha 1-adrenergic antagonist prazosin, doxazosin & terazosin may be effective. Sympatholytic agents methyldopa, guanethidine & phenoxybenzamine may be useful. Digital sympathectomy is helpful in those who are unresponsive to medical therapy.

- 1523 Which of the following is false about acrocyanosis ?
Harrison's 18th Ed. 2072
- A. Persistent cyanosis of the hands
 - B. Normal pulses
 - C. Trophic skin changes and ulcerations do not occur
 - D. None of the above

In acrocyanosis, there is arterial vasoconstriction & secondary dilation of capillaries & venules with resulting persistent cyanosis of hands & feet. Pain, ulcers & gangrene do not occur. Pulses are normal & blanching does not occur.

- 1524 Secondary acrocyanosis is associated with ?
Harrison's 18th Ed. 2072
- A. Brain tumour
 - B. Lung cancer
 - C. Infective hepatitis
 - D. Anorexia nervosa

Secondary acrocyanosis may result from hypoxemia, connective tissue diseases, atheroembolism, antiphospholipid antibodies, cold agglutinins, or cryoglobulins, and is associated with anorexia nervosa and orthostatic tachycardia syndrome.

- 1525 "Atrophie blanche en plaque" is the term given to ?
Harrison's 18th Ed. 2073
- A. Myxoedema dermopathy
 - B. Thyroid acropachy
 - C. Primary livedo reticularis with ulceration
 - D. Secondary livedo reticularis

Primary livedo reticularis with ulceration is called atrophie blanche en plaque.

- 1526 Secondary livedo reticularis can occur with ?
Harrison's 18th Ed. 2073
- A. Atheroembolism
 - B. SLE

- C. Anticardiolipin antibodies
- D. All of the above

Secondary livedo reticularis can occur with atheroembolism, SLE, anticardiolipin antibodies, hyperviscosity, cryoglobulinemia & Sneddon's syndrome (ischemic stroke & livedo reticularis).

- 1527 The other name of 'Pernio' is ?
Harrison's 18th Ed. 2073
- A. Acrocyanosis
 - B. Erythromelalgia
 - C. Chilblains
 - D. Frostbite

- 1528 Which of the following best relates to Pernio (Chilblains) ?
Harrison's 18th Ed. 2073
- A. Atheroembolism
 - B. Mechanical trauma
 - C. Vasculitic disorder
 - D. All of the above

Pernio (Chilblains) is a vasculitic disorder associated with exposure to cold. Raised erythematous lesions develop on lower part of legs & feet in cold weather. These are associated with pruritus and a burning sensation, and they may blister and ulcerate.

- 1529 Which of the following is false about erythromelalgia ?
Harrison's 18th Ed. 2073
- A. Characterized by burning pain and erythema of extremities
 - B. Feet involved more frequently than hands
 - C. Males affected more frequently than females
 - D. None of the above

Erythromelalgia is characterized by burning pain and erythema of the extremities. The feet are involved more frequently than hands, and males are affected more frequently than females.

- 1530 Which of the following is false about erythromelalgia ?
Harrison's 18th Ed. 2073
- A. May be secondary to myeloproliferative disorders
 - B. May occur as an adverse effect of nifedipine
 - C. May occur as an adverse effect of bromocriptine
 - D. Burning sensation is precipitated by exposure to cold environment

Secondary erythromelalgia occurs with myeloproliferative disorders such as polycythemia vera and essential thrombocytosis. Less-common causes include drugs, such as calcium channel blockers, bromocriptine, and pergolide; neuropathies; connective tissue diseases, such as SLE and paraneoplastic syndromes. Patients complain of burning in the extremities that is precipitated by exposure to a warm environment and aggravated by a dependent position. The symptoms are relieved by exposing the affected area to cool air or water or by elevation.

- 1531 Venulitis is a feature of ?
Harrison's 18th Ed. 2073
- A. Thromboangiitis obliterans
 - B. Behçet's syndrome
 - C. Homocystinuria
 - D. All of the above

Venulitis occurring in thromboangiitis obliterans, Behçet's syndrome and homocystinuria may cause venous thrombosis.

- 1532 'Phlegmasia cerulea dolens' refers to ?
Harrison's 16th Ed. 1491
- A. Deoxygenated hemoglobin in stagnant veins giving cyanotic hue to limb

- B. Pain on antigravity movement of DVT affected limb
- C. DVT affected veins that are likely to embolize
- D. Chronic venous insufficiency

1533 'Phlegmasia alba dolens' refers to ?

Harrison's 16th Ed. 1491

- A. Deoxygenated hemoglobin in stagnant veins giving cyanotic hue to limb
- B. Pain on antigravity movement of DVT affected limb
- C. DVT affected veins that are likely to embolize
- D. Pallor in markedly edematous DVT affected legs

1534 Primary lymphedema may be associated with ?

Harrison's 18th Ed. 2075

- A. Turner syndrome
- B. Klinefelter syndrome
- C. Noonan syndrome
- D. All of the above

1535 Primary lymphedema may be associated with ?

Harrison's 18th Ed. 2075

- A. Yellow nail syndrome
- B. Intestinal lymphangiectasia syndrome
- C. Lymphangiomatosis
- D. All of the above

Primary lymphedema may be associated with Turner's syndrome, Klinefelter's syndrome, Noonan's syndrome, yellow nail syndrome, intestinal lymphangiectasia syndrome, and lymphangiomatosis.

1536 Lymphedema tarda usually begins after the age of ?

Harrison's 18th Ed. 2075

- A. 1 year
- B. 14 years
- C. 25 years
- D. 35 years

Congenital lymphedema appears shortly after birth, lymphedema praecox has its onset at the time of puberty and lymphedema tarda usually begins after age 35.

1537 Milroy's disease is best described as ?

Harrison's 18th Ed. 2075

- A. Congenital lymphedema
- B. Lymphedema praecox
- C. Lymphedema tarda
- D. Bacterial lymphangitis

Familial forms of congenital lymphedema (Milroy's disease) and lymphedema praecox (Meige's disease) may be inherited in an autosomal dominant manner with variable penetrance.

1538 Most common cause of secondary lymphedema worldwide is ?

Harrison's 18th Ed. 2075

- A. Bacterial lymphangitis
- B. Filariasis
- C. Radiation therapy for breast carcinoma
- D. Pregnancy

Most common cause of secondary lymphedema worldwide is filariasis.

Chapter 250. Pulmonary Hypertension

1539 Which of the following is the most common symptom attributable to pulmonary hypertension ?

Harrison's 18th Ed. 2076

- A. Fatigue
- B. Exertional dyspnea
- C. Syncope
- D. Peripheral edema

Most common symptom attributable to pulmonary hypertension is exertional dyspnea. Other symptoms are fatigue, angina pectoris (RV ischemia), syncope, near syncope & peripheral edema.

1540 Which of the following is a feature of pulmonary hypertension ?

Harrison's 18th Ed. 2076

- A. Increased jugular venous pressure
- B. Reduced carotid pulse
- C. Palpable RV impulse
- D. All of the above

In PAH, physical examination shows increased jugular venous pressure, a reduced carotid pulse, and a palpable RV impulse. Most patients have an increased pulmonic component S2, right-sided S4, and tricuspid regurgitation.

1541 During cardiac catheterization, pressures must be recorded only at ?

Harrison's 18th Ed. 2077

- A. End expiration
- B. End Inspiration
- C. Mid respiration
- D. Any of the above

During cardiac catheterization, pressures must be recorded only at end expiration.

1542 Which of the following reduces pulmonary artery pressure acutely with little effect on systemic vascular bed ?

Harrison's 18th Ed. 2077

- A. Inhaled nitric oxide
- B. Intravenous adenosine
- C. Intravenous epoprostenol
- D. All of the above

Inhaled nitric oxide, IV adenosine & IV epoprostenol reduce pulmonary artery pressure acutely which is a fall in mean pulmonary artery pressure (MPAP) ≥ 10 mmHg & a final MPAP < 40 mmHg.

1543 Pathobiologic process that result in pulmonary arterial hypertension is ?

Harrison's 17th Ed. 1577

- A. Inhibition of voltage-regulated potassium channel
- B. Increased serotonin uptake in smooth-muscle cells
- C. Increased angiotensin expression in smooth-muscle cells
- D. All of the above

In PAH, abnormalities in molecular pathways regulating the pulmonary vascular endothelial and smooth-muscle cells include inhibition of voltage-regulated potassium channel, mutations in the bone morphogenetic protein-2 receptor, increased serotonin uptake in smooth-muscle cells, increased angiotensin expression in smooth-muscle cells & excessive thrombin deposition related to a procoagulant state. There is a loss of apoptosis of smooth-muscle cells allowing their proliferation, and emergence of apoptosis-resistant endothelial cells which can obliterate the vascular lumen.

1544 Mutation involving the gene that code for which of the following is related to familial Idiopathic pulmonary arterial hypertension (IPAH) ?

Harrison's 18th Ed. 2077

- A. Tenascin X
- B. Type II bone morphogenetic protein receptor (BMPR II)
- C. Connective tissue growth factor (CTGF)
- D. Microfibril-associated glycoproteins (MAGPs)

Heterozygous germ-line mutations involving the gene that code the type II bone morphogenetic protein receptor (BMPR II), a member of transforming growth factor (TGF) β superfamily, account for most cases of familial IPAH.

1545 Conventional therapy for pulmonary arterial hypertension includes ?

Harrison's 18th Ed. 2078

- A. Anticoagulation
- B. Diuretics
- C. Calcium channel blockers
- D. All of the above

Anticoagulant therapy is advocated for all patients with PAH as warfarin increases survival of patients with PAH. Diuretic therapy relieves peripheral edema & reduces RV volume overload in presence of tricuspid regurgitation. Patients who have substantial reductions in pulmonary arterial pressure in response to short-acting vasodilators at the time of cardiac catheterization should be treated initially with calcium channel blockers.

1546 Which of the following is an 'Endothelin Receptor Antagonist' used in the treatment of idiopathic pulmonary arterial hypertension ?

Harrison's 18th Ed. 2079

- A. Epoprostenol
- B. Treprostinil
- C. Bosentan
- D. Sildenafil

Endothelin receptor antagonists bosentan and ambrisentan are approved for treatment of PAH. Liver functions must be monitored monthly throughout the duration of use. Bosentan is contraindicated in patients who are on cyclosporine or glyburide concurrently. Sildenafil is a phosphodiesterase-5 inhibitor. Treprostinil is an analogue of epoprostenol.

1547 Phosphodiesterase-5 is responsible for the hydrolysis of which of the following in pulmonary vascular smooth muscle ?

Harrison's 18th Ed. 2079

- A. Cyclic GMP
- B. Cyclic AMP

- C. Endothelin-1
- D. Inositol 1,4,5-trisphosphate (IP_3)

Phosphodiesterase-5 (PDE-5) is responsible for the hydrolysis of cyclic 3',5'-guanosine monophosphate (cyclic GMP) in pulmonary vascular smooth muscle which induces relaxation of smooth muscle. Inhibitors of PDE-5 such as sildenafil, vardenafil, and tadalafil reduce the breakdown of cyclic GMP. Nitric oxide increases the production of cyclic GMP.

1548 Which of the following prostacyclins is used for treatment of PAH ?

Harrison's 18th Ed. 2079

- A. Iloprost
- B. Epoprostenol
- C. Treprostinil
- D. All of the above

1549 Of the following collagen vascular diseases, PAH is commonest in ?

Harrison's 18th Ed. 2080

- A. Systemic lupus erythematosus
- B. Scleroderma
- C. Rheumatoid arthritis
- D. Dermatomyositis

All collagen vascular diseases may be associated with PAH. It is common with CREST syndrome & scleroderma. It is less frequent in SLE, Sjögren's syndrome, dermatomyositis, polymyositis & RA.

1550 CREST syndrome includes all except ?

Harrison's 18th Ed. 2080

- A. Calcinosis
- B. Raynaud's phenomenon
- C. Sclerodactyly
- D. Thrombosis

CREST syndrome includes Calcinosis, Raynaud's phenomenon, Esophageal involvement, Sclerodactyly, and Telangiectasia.

1551 Which of the following can produce pulmonary hypertension ?

Harrison's 18th Ed. 2080

- A. Portal Hypertension
- B. Obstructive sleep apnea (OSA)
- C. Sickle cell disease
- D. All of the above

ANSWERS CARDIOLOGY

1 D	34 C	67 D	100 D	133 C	166 B
2 C	35 D	68 C	101 B	134 C	167 C
3 A	36 A	69 C	102 D	135 B	168 A
4 D	37 C	70 D	103 D	136 D	169 B
5 A	38 B	71 A	104 C	137 D	170 A
6 C	39 C	72 C	105 A	138 D	171 C
7 A	40 B	73 D	106 D	139 A	172 C
8 B	41 A	74 A	107 A	140 A	173 D
9 A	42 B	75 D	108 B	141 D	174 D
10 D	43 C	76 B	109 A	142 D	175 C
11 A	44 D	77 B	110 B	143 D	176 D
12 C	45 A	78 B	111 C	144 C	177 C
13 A	46 D	79 D	112 A	145 D	178 C
14 D	47 C	80 B	113 D	146 A	179 D
15 D	48 C	81 D	114 B	147 D	180 B
16 B	49 A	82 D	115 C	148 A	181 C
17 A	50 B	83 C	116 D	149 B	182 C
18 C	51 D	84 B	117 C	150 D	183 D
19 C	52 B	85 B	118 D	151 C	184 A
20 B	53 A	86 D	119 A	152 B	185 D
21 D	54 A	87 A	120 D	153 D	186 D
22 A	55 C	88 B	121 A	154 D	187 C
23 A	56 D	89 D	122 B	155 D	188 C
24 D	57 A	90 B	123 D	156 D	189 D
25 D	58 C	91 B	124 D	157 D	190 B
26 A	59 B	92 A	125 B	158 B	191 C
27 D	60 A	93 C	126 B	159 B	192 D
28 B	61 D	94 B	127 A	160 C	193 A
29 B	62 C	95 A	128 B	161 B	194 D
30 C	63 B	96 A	129 B	162 D	195 B
31 A	64 D	97 A	130 D	163 C	196 D
32 A	65 D	98 A	131 D	164 A	197 B
33 B	66 D	99 D	132 D	165 B	198 A

ANSWERS CARDIOLOGY

199 D	232 D	265 B	298 B	331 D	364 A
200 A	233 B	266 A	299 C	332 D	365 B
201 C	234 C	267 C	300 C	333 C	366 C
202 B	235 A	268 C	301 B	334 D	367 D
203 D	236 A	269 D	302 B	335 C	368 D
204 D	237 B	270 C	303 A	336 D	369 C
205 D	238 B	271 B	304 D	337 B	370 D
206 C	239 B	272 D	305 C	338 D	371 D
207 C	240 C	273 A	306 D	339 D	372 C
208 A	241 B	274 A	307 C	340 D	373 B
209 C	242 D	275 B	308 A	341 A	374 D
210 B	243 A	276 D	309 D	342 B	375 D
211 B	244 D	277 A	310 B	343 C	376 D
212 A	245 A	278 D	311 A	344 D	377 A
213 C	246 D	279 B	312 B	345 A	378 C
214 B	247 D	280 C	313 B	346 B	379 D
215 A	248 B	281 A	314 C	347 A	380 C
216 A	249 D	282 D	315 A	348 A	381 D
217 B	250 D	283 C	316 C	349 B	382 B
218 C	251 B	284 B	317 B	350 B	383 A
219 B	252 A	285 B	318 C	351 D	384 D
220 B	253 D	286 C	319 D	352 D	385 D
221 A	254 D	287 D	320 D	353 C	386 D
222 D	255 B	288 A	321 A	354 A	387 D
223 A	256 D	289 C	322 A	355 B	388 C
224 C	257 D	290 C	323 A	356 C	389 D
225 C	258 D	291 C	324 D	357 D	390 D
226 D	259 B	292 C	325 C	358 C	391 A
227 D	260 D	293 B	326 D	359 D	392 B
228 D	261 A	294 C	327 C	360 A	393 D
229 D	262 B	295 B	328 C	361 B	394 D
230 D	263 B	296 B	329 A	362 D	395 A
231 A	264 D	297 B	330 D	363 A	396 A

ANSWERS CARDIOLOGY

397 B	430 A	463 D	496 D	529 D	562 D
398 D	431 B	464 D	497 D	530 A	563 D
399 B	432 C	465 C	498 D	531 D	564 B
400 C	433 D	466 D	499 D	532 C	565 A
401 D	434 C	467 B	500 A	533 B	566 A
402 D	435 A	468 C	501 B	534 D	567 B
403 C	436 B	469 D	502 B	535 A	568 C
404 C	437 D	470 C	503 B	536 C	569 D
405 D	438 B	471 B	504 D	537 B	570 D
406 A	439 D	472 C	505 B	538 D	571 D
407 D	440 D	473 B	506 D	539 A	572 A
408 B	441 A	474 A	507 A	540 D	573 D
409 A	442 C	475 B	508 B	541 D	574 B
410 C	443 D	476 A	509 B	542 D	575 D
411 B	444 D	477 D	510 B	543 B	576 A
412 C	445 A	478 A	511 A	544 D	577 A
413 D	446 D	479 B	512 D	545 A	578 D
414 B	447 C	480 A	513 D	546 D	579 C
415 A	448 D	481 B	514 B	547 C	580 D
416 C	449 A	482 A	515 C	548 D	581 B
417 C	450 D	483 D	516 D	549 D	582 C
418 C	451 D	484 D	517 D	550 D	583 C
419 B	452 D	485 C	518 D	551 B	584 D
420 A	453 D	486 D	519 B	552 B	585 A
421 B	454 D	487 A	520 D	553 C	586 D
422 C	455 D	488 D	521 D	554 C	587 A
423 A	456 D	489 D	522 D	555 D	588 D
424 D	457 B	490 D	523 B	556 B	589 D
425 A	458 C	491 A	524 D	557 A	590 D
426 D	459 A	492 A	525 A	558 A	591 D
427 C	460 B	493 D	526 C	559 D	592 D
428 D	461 B	494 D	527 B	560 B	593 D
429 C	462 B	495 D	528 C	561 A	594 D

ANSWERS CARDIOLOGY

595 C	628 C	661 D	694 D	727 A	760 A
596 D	629 B	662 D	695 A	728 A	761 D
597 D	630 C	663 C	696 D	729 A	762 A
598 A	631 C	664 D	697 D	730 C	763 A
599 D	632 A	665 C	698 C	731 D	764 D
600 C	633 C	666 C	699 B	732 C	765 D
601 D	634 C	667 D	700 C	733 D	766 B
602 D	635 D	668 D	701 D	734 A	767 C
603 D	636 D	669 D	702 C	735 A	768 D
604 A	637 B	670 D	703 A	736 C	769 D
605 D	638 B	671 D	704 A	737 D	770 D
606 D	639 D	672 B	705 B	738 A	771 D
607 B	640 B	673 D	706 B	739 A	772 C
608 D	641 D	674 D	707 A	740 B	773 C
609 D	642 D	675 B	708 A	741 B	774 D
610 D	643 D	676 B	709 C	742 C	775 C
611 D	644 D	677 D	710 C	743 C	776 D
612 D	645 D	678 D	711 B	744 C	777 A
613 B	646 D	679 C	712 C	745 D	778 D
614 C	647 D	680 D	713 D	746 A	779 A
615 D	648 D	681 C	714 D	747 A	780 D
616 D	649 D	682 B	715 D	748 A	781 B
617 B	650 D	683 A	716 D	749 B	782 B
618 B	651 B	684 A	717 B	750 B	783 A
619 B	652 D	685 D	718 A	751 D	784 C
620 A	653 A	686 C	719 C	752 D	785 C
621 B	654 B	687 C	720 D	753 D	786 C
622 D	655 D	688 C	721 D	754 D	787 D
623 D	656 C	689 D	722 D	755 D	788 D
624 D	657 B	690 B	723 B	756 A	789 B
625 A	658 B	691 B	724 D	757 D	790 D
626 D	659 D	692 A	725 D	758 D	791 D
627 A	660 D	693 D	726 A	759 C	792 C

ANSWERS CARDIOLOGY

793 D	826 D	859 A	892 A	925 C	958 B
794 B	827 D	860 B	893 C	926 D	959 C
795 A	828 D	861 B	894 B	927 D	960 A
796 D	829 C	862 D	895 A	928 A	961 C
797 D	830 C	863 D	896 B	929 D	962 C
798 A	831 C	864 B	897 A	930 D	963 B
799 C	832 D	865 C	898 C	931 D	964 C
800 D	833 C	866 A	899 C	932 A	965 D
801 C	834 D	867 D	900 C	933 C	966 D
802 C	835 A	868 D	901 C	934 D	967 D
803 B	836 C	869 D	902 B	935 B	968 D
804 A	837 D	870 D	903 A	936 D	969 C
805 B	838 B	871 C	904 D	937 D	970 D
806 D	839 C	872 D	905 D	938 B	971 C
807 C	840 D	873 D	906 B	939 D	972 D
808 D	841 D	874 D	907 B	940 D	973 B
809 D	842 A	875 A	908 B	941 B	974 D
810 B	843 D	876 A	909 D	942 C	975 C
811 D	844 B	877 B	910 D	943 B	976 D
812 C	845 D	878 D	911 D	944 B	977 B
813 D	846 D	879 B	912 D	945 B	978 D
814 D	847 B	880 C	913 B	946 D	979 C
815 D	848 D	881 D	914 C	947 D	980 C
816 D	849 B	882 B	915 B	948 B	981 B
817 D	850 B	883 A	916 B	949 B	982 D
818 C	851 B	884 D	917 C	950 D	983 B
819 B	852 C	885 A	918 A	951 D	984 B
820 A	853 A	886 A	919 D	952 D	985 A
821 D	854 D	887 A	920 D	953 A	986 D
822 C	855 B	888 D	921 B	954 A	987 D
823 C	856 D	889 D	922 D	955 C	988 D
824 D	857 B	890 D	923 D	956 A	989 C
825 D	858 D	891 A	924 D	957 D	990 D

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991 D	1024 A	1057 D	1090 A	1123 B	1156 A
992 A	1025 C	1058 C	1091 A	1124 A	1157 D
993 D	1026 B	1059 D	1092 B	1125 D	1158 D
994 A	1027 B	1060 B	1093 B	1126 B	1159 A
995 B	1028 D	1061 A	1094 D	1127 D	1160 A
996 B	1029 C	1062 D	1095 D	1128 C	1161 C
997 C	1030 D	1063 C	1096 B	1129 A	1162 A
998 B	1031 A	1064 C	1097 D	1130 D	1163 D
999 D	1032 A	1065 B	1098 D	1131 D	1164 A
1000 C	1033 D	1066 D	1099 D	1132 D	1165 B
1001 D	1034 B	1067 C	1100 D	1133 B	1166 A
1002 D	1035 C	1068 B	1101 C	1134 D	1167 D
1003 A	1036 D	1069 C	1102 B	1135 B	1168 D
1004 D	1037 A	1070 A	1103 D	1136 B	1169 D
1005 B	1038 C	1071 C	1104 B	1137 C	1170 B
1006 D	1039 D	1072 A	1105 D	1138 D	1171 D
1007 D	1040 B	1073 C	1106 A	1139 D	1172 C
1008 D	1041 B	1074 B	1107 C	1140 D	1173 D
1009 A	1042 C	1075 B	1108 C	1141 D	1174 D
1010 D	1043 C	1076 B	1109 C	1142 B	1175 C
1011 D	1044 C	1077 C	1110 B	1143 B	1176 C
1012 C	1045 B	1078 D	1111 C	1144 D	1177 A
1013 D	1046 B	1079 A	1112 B	1145 A	1178 D
1014 C	1047 A	1080 A	1113 D	1146 D	1179 D
1015 C	1048 D	1081 A	1114 C	1147 A	1180 D
1016 D	1049 D	1082 A	1115 A	1148 B	1181 D
1017 D	1050 D	1083 B	1116 C	1149 A	1182 D
1018 B	1051 D	1084 D	1117 C	1150 D	1183 D
1019 C	1052 D	1085 B	1118 B	1151 D	1184 D
1020 D	1053 C	1086 A	1119 A	1152 C	1185 C
1021 D	1054 A	1087 A	1120 D	1153 A	1186 B
1022 C	1055 D	1088 D	1121 D	1154 A	1187 A
1023 D	1056 C	1089 A	1122 D	1155 D	1188 D

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1189 B	1222 B	1255 D	1288 B	1321 B	1354 D
1190 B	1223 B	1256 D	1289 A	1322 A	1355 B
1191 C	1224 D	1257 A	1290 B	1323 D	1356 D
1192 C	1225 C	1258 A	1291 C	1324 C	1357 A
1193 D	1226 D	1259 B	1292 B	1325 C	1358 A
1194 D	1227 C	1260 D	1293 D	1326 C	1359 A
1195 D	1228 D	1261 B	1294 D	1327 B	1360 B
1196 D	1229 D	1262 A	1295 B	1328 C	1361 B
1197 A	1230 D	1263 D	1296 D	1329 B	1362 A
1198 C	1231 C	1264 D	1297 C	1330 D	1363 C
1199 D	1232 B	1265 D	1298 D	1331 B	1364 A
1200 C	1233 C	1266 B	1299 D	1332 B	1365 D
1201 D	1234 D	1267 D	1300 C	1333 A	1366 B
1202 A	1235 B	1268 C	1301 D	1334 B	1367 A
1203 B	1236 D	1269 B	1302 D	1335 C	1368 D
1204 D	1237 C	1270 D	1303 A	1336 C	1369 C
1205 A	1238 D	1271 C	1304 D	1337 D	1370 C
1206 D	1239 C	1272 B	1305 B	1338 D	1371 B
1207 C	1240 B	1273 D	1306 A	1339 D	1372 D
1208 C	1241 C	1274 A	1307 D	1340 C	1373 D
1209 D	1242 A	1275 D	1308 A	1341 B	1374 C
1210 C	1243 A	1276 A	1309 B	1342 B	1375 A
1211 D	1244 B	1277 D	1310 B	1343 B	1376 D
1212 B	1245 D	1278 C	1311 D	1344 D	1377 D
1213 D	1246 D	1279 C	1312 B	1345 A	1378 D
1214 D	1247 C	1280 B	1313 D	1346 A	1379 D
1215 B	1248 D	1281 A	1314 D	1347 B	1380 C
1216 A	1249 D	1282 B	1315 C	1348 C	1381 B
1217 D	1250 D	1283 B	1316 D	1349 D	1382 A
1218 A	1251 C	1284 D	1317 D	1350 A	1383 D
1219 A	1252 D	1285 C	1318 B	1351 D	1384 D
1220 B	1253 A	1286 B	1319 D	1352 D	1385 B
1221 A	1254 C	1287 C	1320 B	1353 D	1386 B

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1387 D	1420 A	1453 D	1486 B	1519 D
1388 D	1421 D	1454 D	1487 C	1520 D
1389 D	1422 D	1455 B	1488 D	1521 D
1390 B	1423 D	1456 A	1489 A	1522 D
1391 D	1424 B	1457 D	1490 C	1523 D
1392 D	1425 C	1458 C	1491 B	1524 D
1393 D	1426 A	1459 D	1492 D	1525 C
1394 C	1427 D	1460 C	1493 A	1526 D
1395 D	1428 D	1461 D	1494 B	1527 C
1396 C	1429 A	1462 D	1495 D	1528 C
1397 A	1430 A	1463 D	1496 B	1529 D
1398 C	1431 A	1464 C	1497 B	1530 D
1399 D	1432 C	1465 D	1498 D	1531 D
1400 D	1433 D	1466 D	1499 D	1532 A
1401 A	1434 D	1467 D	1500 A	1533 D
1402 A	1435 B	1468 D	1501 B	1534 D
1403 A	1436 A	1469 C	1502 B	1535 D
1404 B	1437 D	1470 D	1503 D	1536 D
1405 B	1438 B	1471 A	1504 C	1537 A
1406 A	1439 B	1472 D	1505 C	1538 B
1407 B	1440 C	1473 D	1506 D	1539 B
1408 C	1441 D	1474 D	1507 A	1540 D
1409 A	1442 A	1475 C	1508 D	1541 A
1410 C	1443 A	1476 D	1509 A	1542 D
1411 C	1444 C	1477 A	1510 C	1543 D
1412 C	1445 B	1478 C	1511 B	1544 B
1413 D	1446 A	1479 B	1512 D	1545 D
1414 D	1447 D	1480 D	1513 B	1546 C
1415 A	1448 C	1481 C	1514 A	1547 A
1416 D	1449 B	1482 B	1515 C	1548 D
1417 D	1450 B	1483 C	1516 D	1549 B
1418 C	1451 B	1484 D	1517 C	1550 D
1419 A	1452 C	1485 B	1518 B	1551 D

Chapter 251. Approach to the Patient with Disease of the Respiratory System

1 Which of the following is the most common of diseases of the respiratory system ?

Harrison's 18th Ed. 2084

- A. Obstructive lung diseases
- B. Restrictive disorders
- C. Pulmonary vascular diseases
- D. Neoplastic diseases of lung

Diseases of respiratory system are obstructive lung diseases, restrictive disorders and abnormalities of pulmonary vasculature. Obstructive lung diseases are most common.

2 Which of the following is included in the category of obstructive lung diseases ?

Harrison's 18th Ed. 2084, Table 251-1

- A. Asthma
- B. Bronchiectasis
- C. Bronchiolitis
- D. All of the above

Obstructive lung diseases include disorders of the airways such as asthma, chronic obstructive pulmonary disease (COPD), bronchiectasis, and bronchiolitis. Bronchitis and Tracheitis is included under the infectious pathology.

3 Which of the following is a type of restrictive lung disease ?

Harrison's 18th Ed. 2084

- A. Parenchymal lung diseases
- B. Abnormalities of chest wall and pleura
- C. Neuromuscular disease
- D. All of the above

4 Which of the following is a disorder of pulmonary vasculature ?

Harrison's 18th Ed. 2084

- A. Pulmonary embolism
- B. Pulmonary hypertension
- C. Pulmonary venoocclusive disease
- D. All of the above

5 Acute shortness of breath is usually associated with ?

Harrison's 18th Ed. 2084

- A. Myocardial infarction
- B. Pulmonary embolism
- C. Pneumothorax
- D. All of the above

Acute shortness of breath is usually associated with laryngeal edema, bronchospasm, myocardial infarction, pulmonary embolism, or pneumothorax.

6 Cough that persists for more than how many weeks is defined as chronic cough ?

Harrison's 18th Ed. 2085

- A. 2 weeks
- B. 4 weeks
- C. 6 weeks
- D. 8 weeks

Cough that persists for more than eight weeks is defined as chronic cough.

7 Chest pain caused by diseases of respiratory system usually originates from involvement of ?

Harrison's 18th Ed. 2085

- A. Parietal pleura
- B. Visceral pleura
- C. Pulmonary parenchyma
- D. Bronchial airways

Lung parenchyma is not innervated with pain fibers. Chest pain from respiratory disorders results from either diseases of parietal pleura (pneumothorax) or pulmonary vascular diseases (pulmonary hypertension).

8 Which of the following is associated with smoking ?

Harrison's 18th Ed. 2085, Harrison's 17th Ed. 1583

- A. Spontaneous pneumothorax
- B. Respiratory bronchiolitis - interstitial lung disease
- C. Pulmonary Langerhans cell histiocytosis
- D. All of the above

COPD, neoplasia, spontaneous pneumothorax, respiratory bronchiolitis-interstitial lung disease, desquamative interstitial pneumonitis (DIP), pulmonary Langerhans cell histiocytosis & pulmonary hemorrhage with Goodpasture's syndrome are associated with smoking.

9 Asymmetric expansion of the chest is due to ?

Harrison's 16th Ed. 1496

- A. Endobronchial obstruction of a large airway
- B. Unilateral parenchymal or pleural disease
- C. Unilateral phrenic nerve paralysis
- D. All of the above

10 Which of the following about lung auscultation is false ?

Harrison's 16th Ed. 1496

- A. Wheeze & rhonchi have same meaning
- B. Crackles are typically inspiratory sounds
- C. Wheezes are more prominent during expiration
- D. Stridor occurs primarily during inspiration

11 Which of the following about lung auscultation is false ?

Harrison's 16th Ed. 1496

- A. Crackles are created when alveoli & small airways open & close with respiration
- B. Wheezes reflect oscillation of airway walls with airflow limitation
- C. Rhonchi is the sound created when there is free liquid in the airway lumen
- D. None of the above

12 Which of the following about stridor is false ?

Harrison's 18th Ed. 2085

- A. High-pitched
- B. Focal inspiratory wheeze
- C. Heard over the neck
- D. Manifestation of upper airway obstruction

Stridor or a low-pitched, focal inspiratory wheeze heard over the neck. It is a manifestation of upper airway obstruction.

13 Crackles sounding like Velcro being ripped apart is a feature of ?

Harrison's 18th Ed. 2085

- A. Bronchiectasis

- B. Pleuritis
- C. IPF
- D. Pulmonary edema

Crackles, or rales are a sign of alveolar disease. Diseases that result in fibrosis of the interstitium (IPF) result in crackles sounding like Velcro being ripped apart.

14 Which of the following is useful in distinguishing crackles due to alveolar fluid and those due to interstitial fibrosis ?

Harrison's 18th Ed. 2085

- A. Air entry
- B. Percussion note
- C. Tactile fremitus
- D. Egophony

Egophony helps to distinguish between crackles associated with alveolar fluid and those associated with interstitial fibrosis. Egophony is auscultation of sound "AH" instead of "EEE" when a patient phonates "EEE." This change in note is due to abnormal sound transmission through consolidated lung and will be present in pneumonia but not in IPF.

15 Chest hyperresonance in pneumothorax is best appreciated at ?

Harrison's 18th Ed. 2086

- A. Apex
- B. Axillary region
- C. Interscapular region
- D. Bases of lung

Chest hyperresonance, particularly at apex, indicates air in pleural space (pneumothorax).

16 All of the following can cause clubbing except ?

Harrison's 16th Ed. 1496

- A. Lung cancer
- B. ILD
- C. Empyema
- D. Wegener's granulomatosis

17 Schamroth's sign is seen in ?

Hutchison's Hunter

- A. Koilonychia
- B. Platynychia
- C. Clubbing
- D. None of the above

18 Clubbing of the digits is not a sign of ?

Harrison's 18th Ed. 2086

- A. COPD
- B. Crohn's disease
- C. Bacterial endocarditis
- D. Interstitial lung disease

Clubbing of the digits is not a sign of COPD, and its presence should alert clinician to initiate an investigation for causes of clubbing. Even cyanosis is a late finding in cor pulmonale & is secondary to a low cardiac output with systemic vasoconstriction & ventilation-perfusion mismatches in lung.

19 Which of the following is a feature of Hypertrophic osteoarthropathy (HOA) ?

Harrison's 18th Ed. 2856

- A. Clubbing of digits
- B. Periosteal new bone formation

- C. Synovial effusions
- D. All of the above

HOA is characterized by clubbing of digits and, in more advanced stages, by periosteal new bone formation and synovial effusions.

20 Which of the following about primary hypertrophic osteoarthropathy is false ?

Harrison's 18th Ed. 2857

- A. Autosomal dominant disorder
- B. Periosteal new bone formation
- C. Smooth & undulating periosteal surface
- D. Hyperhydrosis

Primary or idiopathic hypertrophic osteoarthropathy is an autosomal dominant disorder characterized by periosteal new bone formation of distal extremities with **irregular** periosteal surface, clubbing, hyperhydrosis, thickening of skin of face & forehead, progressive enlargement of hands & feet, and arthralgias. In secondary hypertrophic osteopathy due to pulmonary disorders, exuberant periosteal new bone formation occurs with smooth and undulating periosteal surface.

21 Role of which of the following explains acquired HOA ?

Harrison's 18th Ed. 2857

- A. RBC
- B. Platelets
- C. WBC
- D. All of the above

Recent studies have suggested a role for platelets in the development of HOA. Megakaryocytes & large platelet particles, present in venous circulation, get fragmented in their passage through normal lung. In patients with cyanotic congenital heart disease and in right-to-left shunts, these large platelet particles bypass lung and reach distal extremities, where they interact with endothelial cells. Platelet-endothelial activation in distal portion of extremities results in release of platelet-derived growth factor (PDGF) leading to proliferation of connective tissue & periosteum. Stimulation of fibroblasts by PDGF & transforming growth factor results in cell growth and collagen synthesis. Elevated plasma levels of von Willebrand factor antigen have been found in patients with both primary and secondary forms of HOA, indicating endothelial activation or damage.

22 Touraine-Solente-Golé syndrome refers to ?

Harrison's 18th Ed. 2857

- A. Primary or familial hypertrophic osteoarthropathy
- B. Hemophilic arthropathy
- C. Arthropathy of acromegaly
- D. Arthropathy of hemochromatosis

Primary or familial HOA is called pachydermoperiostitis or Touraine-Solente-Golé syndrome. Usually begins insidiously at puberty, this autosomal dominant trait with variable expression and is nine times more common in boys than in girls.

23 Which of the following is not a feature of primary hypertrophic osteoarthropathy (HOA) ?

Harrison's 18th Ed. 2857

- A. Clubbing
- B. Periostitis
- C. Ptosis
- D. Anhidrosis

Primary HOA is characterized by clubbing, periostitis, and unusual skin features. The skin becomes thickened and coarse. Deep nasolabial folds develop, and the forehead may become furrowed. Patients may have heavy-appearing eyelids and ptosis. The skin is often greasy, and there may be excessive sweating of the hands and feet.

24 Cutis verticis gyrata is a feature of ?

Harrison's 18th Ed. 2857

- A. Scleroderma
- B. Primary HOA
- C. Diabetes mellitus

D. Syphilis

In primary HOA, skin over scalp becomes very thick & corrugated (cutis verticis gyrata).

25 Associated abnormalities observed in primary HOA include all except ?

Harrison's 18th Ed. 2857

- A. Hypertrophic gastropathy
- B. Synovial hypertrophy
- C. Bone marrow failure
- D. Female escutcheon

Associated abnormalities in primary HOA include hypertrophic gastropathy, bone marrow failure, female escutcheon, gynecomastia, and cranial suture defects. Noninflammatory effusions occur in wrists, knees & ankles. Synovial hypertrophy is not found.

26 The sensation experienced by patient in clubbed fingers is ?

Harrison's 18th Ed. 2857

- A. Burning
- B. Itching
- C. Tingling
- D. All of the above

Patients with clubbing may experience a burning sensation in their fingertips.

27 Fishman's classification is used for ?

Harrison's 18th Ed. 2857

- A. Cyanosis
- B. Anemia
- C. Clubbing
- D. Jaundice

An objective measurement of finger clubbing can be made by determining the diameter at the base of the nail and at the distal interphalangeal joint of all 10 digits. Clubbing is present when the sum of the individual digit ratios is >10.

28 Which of the following is present in clubbing ?

Harrison's 18th Ed. 2857

- A. Periungual erythema
- B. Drumstick appearance
- C. Hyperextended distal interphalangeal joint
- D. All of the above

Marked periungual erythema is usually present. When clubbing is advanced, the finger may have a drumstick appearance, and the distal interphalangeal joint can be hyperextended. Periosteal involvement in the distal extremities may produce a burning or deep-seated aching pain. The pain can be quite incapacitating and is aggravated by dependency and relieved by elevation of the affected limbs. The overlying soft tissue may be swollen, and the skin slightly erythematous. Pressure applied over the distal forearms and legs may be quite painful.

29 In a patient with clubbing, pain may be present in all of the following joints except ?

Harrison's 18th Ed. 2857

- A. Ankles
- B. Knees
- C. Hip
- D. Wrists

With clubbing, pain & symmetric arthritis-like changes in shoulders, knees, ankles, wrists & elbows is observed.

30 Which of the following is uncommon in secondary HOA ?

Harrison's 18th Ed. 2857

- A. Excessive sweating

- B. Oiliness of the skin
- C. Thickening of facial skin
- D. All of the above

Unlike primary HOA, excessive sweating and oiliness of the skin and thickening of the facial skin are uncommon in secondary HOA.

31 Out of the following malignancies, HOA is most common in ?

Harrison's 18th Ed. 2857

- A. Carcinoma of esophagus
- B. Lung metastases
- C. Pleural tumors
- D. Thymoma

HOA is most common in bronchogenic carcinoma and pleural tumors. Lung metastases infrequently cause HOA.

32 Unilateral clubbing may be found in which of the following ?

Harrison's 18th Ed. 2858 Table 336-3

- A. Aneurysms of major extremity arteries
- B. Infected arterial grafts
- C. Arteriovenous fistulas of brachial vessels
- D. All of the above

Unilateral clubbing is seen in association with aneurysms of major extremity arteries, with infected arterial grafts & with arteriovenous fistulas of brachial vessels.

33 Clubbing of toes but not fingers is found in ?

Harrison's 18th Ed. 2858 Table 336-3

- A. Infected abdominal aortic aneurysm
- B. Coarctation of aorta
- C. Budd Chiari syndrome
- D. Tetralogy of Fallot

34 Clubbing of toes but not fingers is found in ?

Harrison's 18th Ed. 2858 Table 336-3

- A. VSD
- B. Patent ductus arteriosus
- C. Budd Chiari syndrome
- D. Tetralogy of Fallot

Clubbing of the toes but not fingers is seen in an infected abdominal aortic aneurysm & PDA. Differential cyanosis refers to cyanotic and clubbed toes but not the fingers.

35 Clubbing of a single digit may be found in all except ?

Harrison's 18th Ed. 2858

- A. Trauma
- B. Tophaceous gout
- C. Cystic fibrosis
- D. Sarcoidosis

Clubbing of a single digit may follow trauma, in tophaceous gout and sarcoidosis. With advanced lung disease, clubbing of digits appears in virtually all patients with CF.

36 Which of the following is not a feature of thyroid acropachy ?

Harrison's 18th Ed. 2858

- A. Hypothyroidism
- B. Clubbing
- C. Periostitis of hand bones
- D. Periostitis of feet bones

Hyperthyroidism (Graves' disease) associated with clubbing & periostitis of bones of hands & feet is called thyroid acropachy. It is strongly associated with thyroid dermopathy.

37 Clubbing without cyanosis is frequent in ?

Harrison's 18th Ed. 290

- A. Infective endocarditis
- B. Inflammatory bowel disease
- C. Jackhammer operators
- D. All of the above

Chapter 252. Disturbances of Respiratory Function

38 What is the approximate lung surface area ?

Harrison's 18th Ed. 2087

- A. 50 m²
- B. 60 m²
- C. 70 m²
- D. 80 m²

Alveolar surface area is ~70 m² and volume of thoracic cavity is 7 liters.

39 The respiratory system includes ?

Harrison's 18th Ed. 2087

- A. Lungs
- B. Neuromuscular system
- C. Chest wall (diaphragm & intercostal muscles)
- D. All of the above

Respiratory system includes lungs, neuromuscular system, chest wall (diaphragm & intercostal muscles) & pulmonary circulation.

40 In pulmonary circulation, how many capillaries are present per alveolus ?

Harrison's 16th Ed. 350

- A. ~ 100
- B. ~ 1000
- C. ~ 10000
- D. ~ 100000

In pulmonary circulation, extensive capillary bed with ~1000 capillaries per alveolus exists.

41 What portion of the fresh air inspired with each breath does not reach alveoli but remains in conducting airways of lung ?

Harrison's 17th Ed. 1589

- A. ~ 10 %
- B. ~ 20 %
- C. ~ 30 %
- D. ~ 40 %

~30% of inspired fresh air of each breath does not reach alveoli but remains in the conducting airways of lung (anatomic dead space).

42 Total ventilation each minute is approximately ?

Harrison's 17th Ed. 1589

- A. 5 Liters
- B. 7 Liters
- C. 9 Liters

D. 11 Liters

Total ventilation each minute is ~7 liters (2 liters/minute of dead space ventilation and 5 liters/minute of alveolar ventilation).

43 Each breath has a tidal volume of approximately ?

Harrison's 17th Ed. 1589

- A. 200 mL
- B. 300 mL
- C. 400 mL
- D. 500 mL

Normal individual at rest inspires ~12 to 16 times per minute, each breath has a tidal volume of ~500 mL.

44 The volume of gas that is exhaled from lungs in going from TLC to RV is ?

Harrison's 17th Ed. 1586

- A. Expiratory reserve volume (ERV)
- B. Functional residual capacity (FRC)
- C. Vital capacity (VC)
- D. Tidal volume (V_T)

Volume of gas exhaled from lungs in going from TLC to RV is vital capacity.

45 FEF_{25-75%} is also called ?

Harrison's 17th Ed. 1586

- A. Maximal early expiratory flow rate
- B. Maximal mid expiratory flow rate
- C. Maximal late expiratory flow rate
- D. Maximal pan expiratory flow rate

Average expiratory flow rate during the middle 50% of VC [forced expiratory flow (FEF) between 25 & 75% of VC, or FEF_{25-75%} is also called maximal midexpiratory flow rate (MMFR)].

46 Total lung capacity (TLC) is a sum of ?

Harrison's 17th Ed. 1586 Figure 246-1

- A. VC + RV
- B. VC + FRC
- C. VC + ERV
- D. VC + IC

Spirographic tracings consist of 4 lung capacities (TLC, VC, IC & FRC) & 3 lung volumes (RV, ERV & V_T).

47 Total lung capacity (TLC) is a sum of ?

Harrison's 17th Ed. 1586 Figure 246-1

- A. VC + ERV
- B. VC + FRC
- C. FRC + Tidal volume (V_T)
- D. FRC + IC

48 Total lung capacity (TLC) is a sum of ?

Harrison's 17th Ed. 1586 Figure 246-1

- A. VC + ERV
- B. VC + FRC
- C. IC + ERV + RV
- D. FRC + V_T

49 Vital capacity (VC) is a sum of ?

Harrison's 17th Ed. 1586 Figure 246-1

- A. IC - V_T

- B. $IC + V_T$
- C. $IC + ERV$
- D. $IC - ERV$

50 Transpulmonary pressure (P_{TP}) refers to ?

Harrison's 17th Ed. 1586

- A. Alveolar pressure - pleural pressure
- B. Pleural pressure - alveolar pressure
- C. Endexpiratory - endinspiratory pleural pressure
- D. Endinspiratory - endexpiratory pleural pressure

Transpulmonary pressure or P_{TP} is defined as alveolar pressure minus pleural pressure.

51 Volume of gas in the lungs at the end of a normal exhalation is denoted by ?

Harrison's 17th Ed. 1587

- A. Tidal volume (V_T)
- B. Residual volume (RV)
- C. Expiratory reserve volume (ERV)
- D. Functional residual capacity (FRC)

FRC is defined as the volume of gas in the lungs at the end of a normal exhalation.

52 Which of the following respiratory functions can be measured by a spirometer ?

Harrison's 17th Ed. 1587

- A. Vital Capacity (VC)
- B. Expiratory reserve volume (ERV)
- C. Inspiratory capacity (IC)
- D. All of the above

53 Which of the following respiratory functions cannot be measured by a spirometer ?

Harrison's 17th Ed. 1587

- A. VC
- B. ERV
- C. IC
- D. Residual Volume (RV)

54 Which of the following respiratory functions cannot be measured by a spirometer ?

Harrison's 17th Ed. 1587

- A. VC
- B. ERV
- C. IC
- D. Functional Residual Capacity (FRC)

55 Which of the following respiratory functions cannot be measured by a spirometer ?

Harrison's 17th Ed. 1587

- A. VC
- B. ERV
- C. IC
- D. Total Lung Capacity (TLC)

VC, expiratory reserve volume (ERV), and inspiratory capacity (IC) are measured by having the patient breathe into and out of a spirometer. RV, FRC, and TLC cannot be measured by a spirometer because they include the volume of gas present in the lungs even after a maximal expiration.

56 Helium dilution & body plethysmography are used for estimating ?

Harrison's 17th Ed. 1587

- A. VC
- B. ERV
- C. IC
- D. RV

57 Helium dilution & body plethysmography are used for estimating ?

Harrison's 17th Ed. 1587

- A. VC
- B. ERV
- C. IC
- D. TLC

58 Helium dilution & body plethysmography are used for estimating ?

Harrison's 17th Ed. 1587

- A. VC
- B. ERV
- C. IC
- D. FRC

Helium dilution and body plethysmography are used to measure RV, FRC & TLC.

59 Normal value for the ratio FEV_1 / FVC is ?

Harrison's 16th Ed. 1500

- A. 0.25 to 0.50
- B. 0.50 to 0.75
- C. 0.75 to 0.80
- D. 0.80 to 1.00

60 During maximal inspiration from RV to TLC, inspiratory flow is most rapid at ?

Harrison's 17th Ed. 1587

- A. Beginning of inspiration
- B. Midpoint of inspiration
- C. Terminal point of inspiration
- D. None of the above

During maximal inspiration from RV to TLC, inspiratory flow is most rapid at midpoint of inspiration.

61 Maximal inspiratory pressure (MIP) and maximal expiratory pressure (MEP) are useful in assessing ?

Harrison's 17th Ed. 1587

- A. Strength of respiratory muscles
- B. Lung recoil
- C. Airway obstruction
- D. All of the above

Strength of respiratory muscles is determined by estimating the maximal inspiratory pressure (MIP) and the maximal expiratory pressure (MEP).

62 Abnormality noted on routine testing of pulmonary function in early obstructive disease is ?

Harrison's 17th Ed. 1588

- A. Increased FEV_1/VC
- B. Depression in $FEF_{25-75\%}$

- C. Coved early portion of flow-volume curve
- D. All of the above

With early obstructive disease, FEV₁/VC may be normal. Only abnormalities noted may be depression in FEF_{25-75%} & coved terminal portion of forced expiratory flow-volume curve.

63 Which of the following is true in obstructive lung disease ?

Harrison's 17th Ed. 1588

- A. Decreased TLC
- B. Ratio RV / TLC increased
- C. Increased VC
- D. None of the above

In obstructive disease, TLC is normal or increased, residual volume is elevated and RV / TLC is increased. VC is frequently decreased.

64 Which of the following is decreased in pulmonary parenchymal restrictive lung disease ?

Harrison's 17th Ed. 1588

- A. TLC
- B. VC
- C. RV
- D. All of the above

In pulmonary parenchymal restrictive disease, TLC, VC & RV are decreased. FEF rates are preserved.

65 Which of the following is decreased in neuromuscular weakness causing pulmonary extraparenchymal restrictive lung disease ?

Harrison's 17th Ed. 1588

- A. TLC
- B. VC
- C. MIP
- D. All of the above

With extraparenchymal pulmonary disease due to neuromuscular disease (respiratory muscle weakness), TLC is decreased, RV is not significantly affected & MIP is decreased. Expiratory flow rates are preserved.

66 Normal mean pulmonary artery pressure is ?

Harrison's 17th Ed. 1588

- A. 5 mmHg
- B. 10 mmHg
- C. 15 mmHg
- D. 20 mmHg

Normal mean pulmonary artery pressure is 15 mmHg, as compared to ~95 mmHg for the normal mean aortic pressure.

67 In an upright person, pulmonary arterial pressure (PAP) is lowest at ?

Harrison's 17th Ed. 1588

- A. Apex of lung
- B. Lung base
- C. Right middle lobe
- D. Apical segment of lower lobe

68 In an upright person, pulmonary arterial pressure (PAP) is highest at ?

Harrison's 17th Ed. 1588

- A. Apex of lung
- B. Lung base

- C. Right middle lobe
- D. Apical segment of lower lobe

In an upright person, perfusion is least at apex of lung & greatest at base. Ventilation-perfusion ratios are higher at lung apices than at the lung bases.

69 In upright position, pulmonary perfusion is least at ?

Harrison's 17th Ed. 1588

- A. Apex
- B. Lung base
- C. Right middle lobe
- D. Apical segment of lower lobe

70 Pulmonary vascular resistance (PVR) is calculated by ?

Harrison's 17th Ed. 1588

- A. $PVR = 60(PAP - PCW)/CO$
- B. $PVR = 70(PAP - PCW)/CO$
- C. $PVR = 80(PAP - PCW)/CO$
- D. $PVR = 90(PAP - PCW)/CO$

Pulmonary vascular resistance (PVR) = $80[Pulmonary\ arterial\ pressure\ (PAP) - pulmonary\ capillary\ wedge\ pressure\ (PCW)] / cardiac\ output\ (CO)$. PAP & PCW are measured directly with flow-directed Swan-Ganz catheter in pulmonary artery. CO is obtained by thermodilution method.

71 Normal value for pulmonary vascular resistance is ?

Harrison's 17th Ed. 1588

- A. 25 to 50 dyn · s/cm⁵
- B. 50 to 150 dyn · s/cm⁵
- C. 150 to 250 dyn · s/cm⁵
- D. 250 to 500 dyn · s/cm⁵

Normal value for pulmonary vascular resistance is ~50 - 150 dyn · s/cm⁵.

72 Normally, O₂ & CO₂ diffusion equilibration is complete in what time of RBC's transit through pulmonary capillary bed ?

Harrison's 17th Ed. 1589

- A. $\frac{1}{3}$
- B. $\frac{1}{2}$
- C. $\frac{3}{4}$
- D. Throughout transit time

Normally, O₂ & CO₂ diffusion is rapid. Equilibration is complete within one-third of transit time of RBC's through pulmonary capillary bed.

73 Hemoglobin is almost fully (~90%) saturated at a P_{O2} of ?

Harrison's 17th Ed. 1590

- A. 60 mmHg
- B. 70 mmHg
- C. 80 mmHg
- D. 90 mmHg

Hemoglobin is almost fully (~90%) saturated at a P_{O2} of 60 mmHg.

74 When fully saturated, each gram of hemoglobin is capable of carrying ?

Harrison's 17th Ed. 1590

- A. 0.34 mL of O₂
- B. 1.34 mL of O₂
- C. 2.34 mL of O₂
- D. 3.34 mL of O₂

When fully saturated, each gram of Hb is capable of carrying 1.34 mL O₂

75 Amount of O₂ transported bound to hemoglobin is ?

Harrison's 17th Ed. 1590

- A ~ 10 mL per deciliter of blood
- B. ~ 20 mL per deciliter of blood
- C. ~ 30 mL per deciliter of blood
- D. ~ 40 mL per deciliter of blood

Amount of O₂ transported bound to hemoglobin is ~20 mL per deciliter of blood.

76 Amount of O₂ transported dissolved in plasma is ?

Harrison's 17th Ed. 1590

- A ~ 0.3 mL O₂ per deciliter of blood
- B. ~ 1.3 mL O₂ per deciliter of blood
- C. ~ 2.3 mL O₂ per deciliter of blood
- D. ~ 3.3 mL O₂ per deciliter of blood

Amount of O₂ transported dissolved in plasma is ~0.3 mL per deciliter of blood.

77 In mixed venous blood, the P_{O₂} is normally about ?

Harrison's 17th Ed. 1590

- A 40 mmHg
- B. 60 mmHg
- C. 80 mmHg
- D. 100 mmHg

In mixed venous blood, the P_{O₂} is normally ~40 mmHg

78 In a healthy young person breathing room air, the PA_{O₂} - Pa_{O₂} is normally ?

Harrison's 17th Ed. 1590 Figure 246-5

- A < 15 mmHg
- B. < 30 mmHg
- C. < 45 mmHg
- D. < 60 mmHg

In healthy person breathing room air, PA_{O₂} - Pa_{O₂} is normally <15 mmHg for subjects <=30 years and increases by ~3 mmHg per decade after age 30.

79 Pulse oximeter calculates O₂ saturation by measuring absorption of how many wavelengths of light ?

Harrison's 17th Ed. 1590

- A 2
- B. 5
- C. 8
- D. 12

Pulse oximeter calculates O₂ saturation by measuring absorption of TWO wavelengths of light by oxygenated & nonoxygenated Hb. Percentage of Hb saturated with oxygen - Sa_{O₂} is displayed.

80 Specific relationship between Pa_{O₂} & Sa_{O₂} depends on ?

Harrison's 17th Ed. 1590

- A Temperature
- B. pH
- C. Erythrocyte concentration of 2,3-diphosphoglycerate
- D. All of the above

Arterial P_{O₂} of 60 mmHg corresponds to Sa_{O₂} of 90%. Specific relationship between Pa_{O₂} & Sa_{O₂} depends on temperature, pH & RBC concentration of 2,3-DPG.

81 CO-oximeter can distinguish which of the following ?

Harrison's 17th Ed. 1590

- A Oxyhemoglobin
- B. Carboxyhemoglobin
- C. Methemoglobin
- D. All of the above

CO-oximeter uses at least four wavelengths of light and is capable of distinguishing oxyhemoglobin, deoxygenated hemoglobin, carboxyhemoglobin & methemoglobin.

82 What concentration of carbon monoxide is inhaled to assess DL_{CO} ?

Harrison's 17th Ed. 1590

- A 0.3 %
- B. 0.5 %
- C. 0.75 %
- D. 0.1 %

To assess the diffusing capacity of lung for carbon monoxide (DL_{CO}), 0.3% of carbon monoxide is inhaled in a single breath & held for ~10 seconds.

83 The hallmark of hypoventilation as a cause of hypoxemia is ?

Harrison's 17th Ed. 1591

- A Decrease in Pa_{CO₂}
- B. Elevation in Pa_{CO₂}
- C. Decrease in Pa_{O₂}
- D. Elevation in Pa_{O₂}

Hallmark of hypoventilation as a cause of hypoxemia is an elevation in Pa_{CO₂}.

84 Which of the following is rarely responsible for hypoxemia ?

Harrison's 17th Ed. 1592

- A Abnormalities in diffusion
- B. Decrease in inspired P_{O₂}
- C. Hypoventilation
- D. Shunting

Abnormalities in diffusion are rarely responsible for hypoxemia.

85 Disease associated with lowered DL_{CO} is ?

Harrison's 17th Ed. 1592

- A Interstitial lung disease
- B. Emphysema
- C. Pulmonary vascular disease
- D. All of the above

Lowered DL_{CO} is found in interstitial lung disease, emphysema & pulmonary vascular disease.

86 Diffusing capacity (DL_{CO}) may be elevated in ?

Harrison's 17th Ed. 1592

- A Goodpasture's syndrome
- B. Interstitial lung disease
- C. Emphysema
- D. All of the above

Diffusing capacity may be elevated in congestive heart failure and in alveolar hemorrhage as in Goodpasture's syndrome. Hb in RBCs in alveolar lumen binds CO leading to increased DL_{CO}.

87 In a normal man aged 40 years, weight 75 kg, height 175 cm, what is the expected value of FVC ?

Harrison's 16th Ed. Appendix 14

- A 3.2 Litres
- B. 4.0 Litres

- C. 4.8 Litres
- D. 5.6 Litres

88 In a normal man aged 40 years, weight 75 kg, height 175 cm, what is the expected value of FEV₁ ?

Harrison's 16th Ed. Appendix 14

- A. 2.8 Litres
- B. 3.0 Litres
- C. 3.8 Litres
- D. 5.2 Litres

89 In a normal man aged 40 years, weight 75 kg, height 175 cm, what is the expected value of FEV₁/FVC ratio ?

Harrison's 16th Ed. Appendix 14

- A. 66 %
- B. 76 %
- C. 86 %
- D. 96 %

90 For cyanosis to occur, hemoglobin concentration should be more than ?

Harrison's 17th Ed. 230

- A. 3 gm %
- B. 4 gm %
- C. 5 gm %
- D. 6 gm %

Cyanosis becomes apparent when the concentration of reduced hemoglobin in capillary blood exceeds 4 gm/dL. It is the absolute, rather than the relative, quantity of reduced hemoglobin that is important in producing cyanosis.

91 In peripheral cyanosis, the extremities are ?

Harrison's 17th Ed. 2183

- A. Hypothermic
- B. Hyperthermic
- C. Normothermic
- D. Any of the above

92 In which condition, cyanosis does not occur ?

Harrison's 16th Ed. 211

- A. Perihelal circulatory failure
- B. Cyanotic congenital heart disease
- C. Carbon monoxide poisoning
- D. All of the above

93 Which of the following site is best for detecting central cyanosis ?

Harrison's 17th Ed. 230

- A. Skin
- B. Nails
- C. Oral mucous membranes
- D. Ear lobule

Examination of mucous membranes in oral cavity & conjunctivae rather than skin is more helpful in the detection of cyanosis.

94 Cyanosis usually becomes manifest at an altitude of ?

Harrison's 17th Ed. 230

- A. 1000 meters

- B. 2000 meters
- C. 4000 meters
- D. 6000 meters

Cyanosis usually becomes manifest at an altitude of 4000 meters (13,000 ft).

95 At a height of 8000 feet, the FI_{O2} is about ?

Harrison's 16th Ed. 210

- A. 80 mmHg
- B. 100 mmHg
- C. 120 mmHg
- D. 140 mmHg

96 At a height of 16000 feet, the FI_{O2} is about ?

Harrison's 16th Ed. 210

- A. 62 mmHg
- B. 85 mmHg
- C. 115 mmHg
- D. 138 mmHg

97 Which of the following comes first in clinical manifestation of Raynaud's phenomenon ?

Harrison's 17th Ed. 1572

- A. Blanching or pallor
- B. Cyanosis
- C. Rubor or erythema
- D. Oedema

Raynaud's phenomenon is characterized by episodic digital ischemia & a triphasic color response manifested clinically by sequential development of digital blanching (vasoconstriction), cyanosis (ischemia) & rubor (reperfusion) of fingers or toes following cold exposure & subsequent rewarming.

98 Which of the following is false about acrocyanosis ?

Harrison's 17th Ed. 1573

- A. Episodic peripheral cyanosis of the hands
- B. Cyanosis intensified by cold
- C. Trophic skin changes & ulcerations do not occur
- D. Normal pulses

*In acrocyanosis, there is arterial vasoconstriction & secondary dilation of capillaries & venules with resulting **persistent** peripheral cyanosis of the hands & feet, intensified by cold exposure, normal pulses, moist palms, no trophic skin changes & ulcerations.*

99 In frostbite, after rewarming, which of the following occurs ?

Harrison's 17th Ed. 1573

- A. Cyanosis & erythema
- B. Wheal-and-flare formation
- C. Edema & superficial blisters
- D. All of the above

In frostbite, after rewarming there is cyanosis & erythema, wheal-and-flare formation, edema, and superficial blisters.

100 Differential cyanosis in patent ductus arteriosus means ?

Harrison's 17th Ed. 1461

- A. Cyanosis in fingers but not toes
- B. Cyanosis in toes but not fingers
- C. Cyanosis in lips & cheek but not fingers & toes
- D. None of the above

In PDA with severe pulmonary vascular disease, reversal of flow through ductus results in shunting

of unoxygenated blood to descending aorta. Toes, but not fingers become cyanotic and clubbed - differential cyanosis.

101 Which of the following is false about hemoptysis ?

Harrison's 17th Ed. 227, 1735

- A. Bright red colour
- B. Alkaline pH
- C. Massive hemoptysis is > 600 mL/day
- D. None of the above

Massive hemoptysis is defined as >600 mL of blood produced in 24 hours.

102 Hemoptysis can originate from disease of ?

Harrison's 17th Ed. 1583

- A. Airways
- B. Pulmonary parenchyma
- C. Pulmonary vasculature
- D. All of the above

Hemoptysis can originate from disease of airways (acute or chronic bronchitis, bronchiectasis, cystic fibrosis, bronchogenic carcinoma or bronchial carcinoid tumors), pulmonary parenchyma (pneumonia, lung abscess, tuberculosis, Aspergillosis, Goodpasture's syndrome, idiopathic pulmonary hemosiderosis), or pulmonary vasculature (pulmonary thromboembolic disease, pulmonary arteriovenous malformations).

103 A dilated vessel in a pulmonary tuberculosis cavity is called ?

Harrison's 17th Ed. 1010

- A. Rasmussen's aneurysm
- B. Bouchart's aneurysm
- C. Charcot's aneurysm
- D. Beyer's aneurysm

In pulmonary tuberculosis, massive hemoptysis may occur from rupture of a dilated vessel in a cavity (Rasmussen's aneurysm).

104 Kussmaul's breathing is seen in ?

Harrison's 17th Ed. 1718

- A. Diabetic ketoacidosis
- B. Hypoglycemia
- C. Superior vena cava syndrome
- D. Pneumothorax

105 Kussmaul breathing may also occur with ?

Harrison's 17th Ed. 1718

- A. Bacterial meningitis
- B. Pontomesencephalic lesions
- C. Herpes zoster
- D. All of the above

Rapid, deep (Kussmaul) breathing usually implies metabolic acidosis but may also occur with pontomesencephalic lesions.

106 Which of the following statements about stridor is false ?

Harrison's 16th Ed. 1496

- A. Occurs primarily during inspiration
- B. Represents flow through a narrowed lower airway
- C. Occurs in an infant with croup
- D. Occurs in a patient with retropharyngeal growth

107 Radiographic "thumbprint sign" is seen in ?

Harrison's 17th Ed. 213

- A. Laryngitis

- B. Croup syndrome
- C. Acute epiglottitis
- D. All of the above

Neck radiographs in acute epiglottitis (supraglottitis) typically reveal an enlarged edematous epiglottis referred to as the thumbprint sign.

108 "Hot potato" voice is a feature of ?

Harrison's 17th Ed. 212

- A. Oropharyngeal candidiasis (thrush)
- B. Lemierre's disease
- C. Vincent's angina
- D. Ludwig's angina

Ludwig's angina is a rapidly progressive cellulitis of sublingual & submandibular spaces following infected or recently extracted tooth (lower II & III molars). Patients speak in a "hot potato" voice.

109 "Trench mouth" is related to ?

Harrison's 17th Ed. 212

- A. Oropharyngeal candidiasis (thrush)
- B. Lemierre's disease
- C. Vincent's angina
- D. Ludwig's angina

Vincent's angina (acute necrotizing ulcerative gingivitis or trench mouth) is a form of gingivitis characterized by painful, inflamed gingiva with ulcerations of interdental papillae that bleed easily.

110 Harrison's groove is characteristic of ?

Harrison's 15th Ed. Chapter 340

- A. Emphysema
- B. Pneumothorax
- C. Rickets
- D. Pleural effusion

111 Tietze's syndrome refers to painful swelling of ?

Harrison's 17th Ed. 2183

- A. Ribs
- B. Costochondral articulations
- C. Intercostal muscles
- D. All of the above

Tietze syndrome is manifested by painful swelling of one or more costochondral articulations, usually II or III costochondral joint presenting as anterior chest pain radiating to arms or shoulders, aggravated by sneezing, coughing, deep inspirations or twisting motions of chest.

112 Which of the following is false about costochondritis ?

Harrison's 17th Ed. 2183

- A. Pain of costochondral articulations without swelling
- B. Observed mostly in women over age 40 years
- C. Affects III, IV and V costochondral joints
- D. None of the above

Costochondritis is pain of costochondral articulations without swelling, observed mostly in women over age 40 years and tends to affect the III, IV and V costochondral joints.

113 Pectus carinatum is also called ?

Harrison's 16th Ed. 1569

- A. Rachitic rosaries
- B. Kyphoscoliosis
- C. Pigeon-breast
- D. Barrel chest

Pectus carinatum is also called Pigeon-breast. It is the reverse of pectus excavatum with the sternum protruding anteriorly. It is associated with congenital ASD or VSD & severe prolonged childhood asthma.

114 Which of the following is false about "Pectus excavatum" ?

Harrison's 16th Ed. 1569

- A. Also called Funnel chest
- B. Pulmonary function tests are nearly normal
- C. Lower sternum commonly involved
- D. None of the above

In Pectus excavatum, lower portion of sternum is displaced posteriorly and the anterior ribs are markedly bowed, which results in a depressed panel in the anterior chest. Respiratory symptoms are uncommon & pulmonary function tests are nearly normal.

115 'Sulphur granule pus' is seen in infection with ?

Harrison's 16th Ed. 937

- A. Tuberculosis
- B. Mycoplasma
- C. Actinomycosis
- D. Hodgkin's disease

Sulfur granules are characteristic of actinomycosis.

116 Mondor's disease refers to ?

- A. Subcutaneous anterior thoracic phlebitis
- B. Herpes zoster infection of thoracic nerve roots
- C. Angina inversa
- D. Xiphoidalgia

117 Which of the following is false about Da Costa's syndrome ?

- A. Chronic anxiety
- B. Often, pain occurs after exercise
- C. Pain is usually left submammary
- D. None of the above

118 Which of the following is false about Bornholm disease ?

Harrison's 17th Ed. 1210

- A. Also called epidemic pleurodynia
- B. Pain is like that of pleurisy
- C. Due to Coxsackie virus
- D. None of the above

Pleurodynia presents with acute onset of fever & spasms of pleuritic chest or upper abdominal pain. Most cases are due to coxsackievirus B and occur during epidemics.

119 Hamman's sign is characteristic of ?

Harrison's 17th Ed. 1661

- A. Diaphragmatic paralysis
- B. Pneumomediastinum
- C. Kyphoscoliosis
- D. Tension pneumothorax

In pneumomediastinum, there is gas in the interstices of mediastinum. Subcutaneous emphysema in suprasternal notch and Hamman's sign (crunching or clicking noise synchronous with heartbeat & best heard in left lateral decubitus position) are characteristic features.

120 All of the following can cause diffuse nodular opacities in chest X-Ray except ?

Harrison's 16th Ed. 1497

- A. Metastatic neoplasm

- B. Pneumoconiosis
- C. Eosinophilic granuloma
- D. Sarcoidosis

121 Specialized tissues that sense the local oxygen tension include all except ?

N Engl J Med 2005;353:2042-55

- A. Glomus cells of carotid body
- B. Neuroepithelial bodies in lungs
- C. Systemic veins
- D. Chromaffin cells of fetal adrenal medulla

122 Specialized tissues that sense the local oxygen tension include all except ?

N Engl J Med 2005;353:2042-55

- A. Smooth-muscle cells of resistance pulmonary arteries
- B. Hepatic vein
- C. Fetoplacental arteries
- D. Ductus arteriosus

123 Vasodilators produced by endothelium are all except ?

N Engl J Med 2005;353:2042-55

- A. Nitric oxide
- B. Prostacyclin
- C. Both of the above
- D. None of the above

124 Vasoconstrictors produced by endothelium are all except ?

N Engl J Med 2005;353:2042-55

- A. Endothelin
- B. Thromboxane A₂
- C. Both of the above
- D. None of the above

125 Angiotensin-converting enzyme (ACE) is present in ?

N Engl J Med 2005;353:2042-55

- A. Pulmonary vascular endothelium
- B. Liver
- C. Kidneys
- D. Intestines

126 Most specific signs of a metabolic encephalopathy is ?

Harrison's 16th Ed. 1624

- A. Bilateral Asterix
- B. Confusion
- C. Seizure
- D. Vomiting

127 Asterix can be found in ?

Harrison's 16th Ed. 1624

- A. Any tonically held posture
- B. Tonically held tongue
- C. Voluntary limb motion
- D. All of the above

254 - Asthma

128 Which of the following statements about asthma is false ?

Harrison's 18th Ed. 2102

- A. 10 - 12% adults and 15% children affected by asthma
- B. Peak age of presentation is 3 years
- C. Sex ratio in adults is equal
- D. None of the above

In childhood asthma, male:female ratio is 2:1, but in adulthood the sex ratio is equalized.

129 Which of the following about asthma is false ?

Harrison's 18th Ed. 2102

- A. Most patients with asthma in affluent countries are atopic
- B. Severity of asthma varies significantly within a patient
- C. Onset of asthma in adulthood rarely become permanently asymptomatic
- D. Inflammatory disease of airways

Severity of asthma does not vary significantly within a given patient.

130 Asthma is a disease of ?

Harrison's 18th Ed. 1508

- A. Large airway
- B. Medium airway
- C. Terminal bronchiole
- D. Respiratory bronchiole

131 The term "atopy" in Greek means ?

N Engl J Med 2001;344:30

- A. Inert
- B. Out of place
- C. Explosive
- D. Mischief

132 Allergic rhinitis is found in what percentage of asthmatic patients ?

Harrison's 18th Ed. 2102

- A. ~ 40 %
- B. ~ 60 %
- C. ~ 80 %
- D. ~ 100 %

Allergic rhinitis is found in over 80% of asthmatic patients.

133 Which of the following is called 'house-dust mite' ?

Harrison's 18th Ed. 2102

- A. Dermatophagoides pteronyssinus
- B. Betula verrucosa
- C. Phleum pratense
- D. Ambrosia artemisiifolia

Dermatophagoides pteronyssinus is called house dust mite.

134 Atopy is due to the genetically determined production of ?

Harrison's 18th Ed. 2102

- A. IgA antibody
- B. IgE antibody

C. IgG antibody

D. IgM antibody

Atopy is due to the genetically determined production of specific IgE antibody

135 Which of the following statements about nonatopic or intrinsic asthma is false ?

Harrison's 18th Ed. 2103

- A. Negative skin test to common inhalant allergens
- B. Normal serum IgE levels
- C. Have mild asthma
- D. Commonly have nasal polyps

Patients with nonatopic or intrinsic asthma usually have more severe, later onset and persistent asthma.

136 Novel gene associated with asthma is ?

Harrison's 18th Ed. 2103

- A. ADAM-33
- B. DPP-10
- C. GPRA
- D. All of the above

Asthma is polygenic. Novel genes associated with asthma include ADAM-33, DPP-10 and GPRA.

137 Which of the following is strongly linked with asthma in genetic association studies ?

Harrison's 18th Ed. 2478

- A. TNFAIP3
- B. ORMDL3
- C. PTPN2
- D. IL23R

Asthma is caused by a combination of poorly understood genetic & environmental factors. Orosomucoid like 3 (ORMDL3) has been strongly linked with asthma in genetic association studies. ORMDL3 is a member of a gene family that encodes transmembrane proteins anchored in the endoplasmic reticulum and asthma patients have elevated expression levels of this gene.

138 Airway mucosa in asthma is infiltrated with ?

Harrison's 18th Ed. 2104

- A. Activated eosinophils
- B. T lymphocytes
- C. Activated mucosal mast cells
- D. All of the above

Autopsy results from patients of established asthma show airway mucosa infiltrated with activated eosinophils and T lymphocytes, and activation of mucosal mast cells. Degree of inflammation is poorly related to disease severity.

139 In asthma, characteristic histologic finding in airways is ?

Harrison's 17th Ed. 1597

- A. Normal parenchymal attachments
- B. Thickened airway smooth muscle
- C. Goblet cell metaplasia
- D. Thickening of basement membrane

In asthma, characteristic finding is thickening of basement membrane due to subepithelial types III and V collagen deposition.

140 Thickening of basement membrane in airway mucosa due to subepithelial collagen deposition is a feature of ?

Harrison's 18th Ed. 2104

- A. Atopic asthma

- B. Nonatopic asthma
- C. Aspirin-sensitive asthma
- D. All of the above

Pathology of asthma is remarkably uniform in different types of asthma, including atopic, nonatopic, occupational, aspirin-sensitive, and pediatric asthma.

141 Which of the following is a histopathologic feature of a small airway in fatal asthma ?

Harrison's 18th Ed. 2104 Figure 254-1

- A. Goblet cell aplasia
- B. Goblet cell dysplasia
- C. Goblet cell metaplasia
- D. Any of the above

Histopathologic feature in a small airway in fatal asthma include shed or friable epithelium, lumen occlusion with a mucous plug, goblet cell metaplasia, thickened airway wall due to subepithelial collagen deposition, increase in basement membrane thickness and airway smooth muscle, vasodilation and increased numbers of blood vessels (angiogenesis). Involvement of airways may be patchy.

142 Mast cell is the key effector cell of the biologic response in ?

Harrison's 16th Ed. 1947

- A. Allergic rhinitis
- B. Urticaria
- C. Anaphylaxis
- D. All of the above

Mast cell is the key effector cell of the biologic response in allergic rhinitis, urticaria, anaphylaxis, and systemic mastocytosis.

143 Human mast cells originate from ?

Harrison's 16th Ed. 1947

- A. CD34+
- B. CD 4+
- C. CD 8+
- D. All of the above

144 In asthmatic patients, mast cells are localized to airway ?

Harrison's 17th Ed. 1598

- A. Epithelial cells
- B. Fibroblasts
- C. Smooth muscle
- D. Parenchyma

In asthmatic patients, mast cells are localized to airway smooth muscle layer.

145 Activated mast cells are found at the airway surface in ?

Harrison's 18th Ed. 2104

- A. Asthma patients
- B. Normal subjects
- C. Patients with eosinophilic bronchitis
- D. All of the above

Activated mast cells are found at the airway surface and also in the airway smooth-muscle layer in asthma patients, but not in normal subjects or patients with eosinophilic bronchitis.

146 Mast cells release which of the following bronchoconstrictor mediators ?

Harrison's 18th Ed. 2104

- A. Histamine
- B. Prostaglandin D₂

- C. Cysteinyl-leukotrienes
- D. All of the above

Mast cells release bronchoconstrictor mediators like histamine, prostaglandin D₂, and cysteinyl-leukotrienes besides several cytokines, chemokines, growth factors, and neurotrophins.

147 In "sensitization", IgE gets attached to human mast cells and ?

Harrison's 16th Ed. 1947

- A. Basophils
- B. Eosinophils
- C. Monocytes
- D. Lymphocytes

The fixation of IgE to human mast cells and basophils, a process termed sensitization, prepares these cells for subsequent antigen-specific activation.

148 Which chain of FcεRI is solely responsible for IgE binding ?

Harrison's 16th Ed. 1947

- A. α chain
- B. β chain
- C. γ chain
- D. All of the above

FcεRI is composed of one α, one β, and two disulfide-linked γ chains, which together cross the plasma membrane seven times. The α chain is responsible for IgE binding, and the β and γ chains provide signal transduction.

149 Bronchial asthma is associated with increased levels of ?

Harrison's 16th Ed. 1508

- A. Leukotrienes
- B. PGI₁
- C. PGI₂
- D. Thromboxane

150 Mechanism by which aspirin produces bronchospasm is ?

Harrison's 18th Ed. 2115

- A. Induction of Haptines
- B. Chronic overexcretion of cysteinyl leukotrienes
- C. Production of T cell derived cytokines
- D. All of the above

Aspirin-sensitive asthma is a well defined subtype of asthma that is usually preceded by perennial rhinitis and nasal polyps in nonatopic patients with a late onset of the disease. Aspirin, even in small doses, characteristically provokes rhinorrhea, conjunctival irritation, facial flushing, and wheezing. There is a genetic predisposition to increased production of cysteinyl-leukotrienes with functional polymorphism of cys-leukotriene C synthase. Asthma is triggered by COX inhibitors, but is persistent even in their absence. All nonselective COX inhibitors should be avoided, but selective COX2 inhibitors are safe to use when an anti-inflammatory analgesic is needed. Aspirin-sensitive asthma responds to usual therapy with ICS. Although antileukotrienes should be effective in these patients, they are no more effective than in allergic asthma. Occasionally, aspirin desensitization is necessary, but this should only be undertaken in specialized centers.

151 Which of the following is a cysteinyl leukotriene ?

Harrison's 16th Ed. 1514

- A. LTC₄
- B. LTD₄
- C. LTE₄
- D. All of the above

152 Cysteinyl leukotrienes were earlier known as ?

N Engl J Med 2007;357:1841-54

- A. Structural inflammatory cell
- B. Slow-reacting substance of anaphylaxis

- C. Crystal structure molecule
- D. Exacerbation molecule

Cysteinyl leukotrienes C₄, D₄ & E₄ were previously termed "slow-reacting substance of anaphylaxis".

153 "Trienes" in word leukotriene stand for ?

N Engl J Med 2007;357:1841-54

- A. Three conjugated double bonds
- B. Three cysteinyl molecules
- C. Three metabolic pathways
- D. Three sulphur molecules

Leukotrienes ("leuko" - WBCs & "trienes" - 3 conjugated double bonds) is a family of products of 5-lipoxygenase pathway of arachidonic acid metabolism. Capacity to form leukotrienes from arachidonate is confined to leukocytes.

154 Synthesis of leukotrienes from arachidonic acid is initiated by 5-lipoxygenase in concert with ?

N Engl J Med 2007;357:1841-54

- A. 5-lipoxygenase - activating protein (FLAP)
- B. 5-lipoxygenase - associated protein (FLAP)
- C. 5-lipoxygenase - augmenting protein (FLAP)
- D. 5-lipoxygenase - assisted protein (FLAP)

Synthesis of leukotrienes from substrate arachidonic acid is initiated by 5-lipoxygenase enhanced by 5-lipoxygenase - activating protein (FLAP).

155 Products of 5-lipoxygenase pathway besides leukotrienes are ?

N Engl J Med 2007;357:1841-54

- A. 5-hydroxyeicosatetraenoic acid
- B. 5-oxo-eicosatetraenoic acid
- C. Lipoxins
- D. All of the above

Products of the 5-lipoxygenase pathway besides leukotrienes are 5-hydroxyeicosatetraenoic acid, 5-oxo-eicosatetraenoic acid, and lipoxins.

156 FcεRI-α is intracellular in which of the following ?

N Engl J Med 2001;344:30

- A. Mast cells
- B. Basophils
- C. Eosinophils
- D. All of the above

Fc portion of circulating IgE binds to high-affinity receptors (FcεRI) present on the surfaces of mast cells and basophils. Chemokines are involved in attracting inflammatory cells from the bronchial circulation into the airways. Eotaxin (CCL11) is selectively attractant to eosinophils via CCR3 and is expressed by epithelial cells of asthmatics, whereas CCL17 (TARC) and CCL22 (MDC) from epithelial cells attract T_H2 cells via CCR4.

157 Macrophages are derived from ?

Harrison's 18th Ed. 2105

- A. Eosinophils
- B. Basophils
- C. Monocytes
- D. Any of the above

Macrophages are derived from blood monocytes.

158 Dendritic cells are ?

Harrison's 18th Ed. 2105

- A. Specialized eosinophil-like cells
- B. Specialized basophil-like cells

- C. Specialized macrophage-like cells
- D. All of the above

Dendritic cells are specialized macrophage-like cells in airway epithelium, which are the major antigen-presenting cells.

159 Which of the following about macrophages is false ?

Harrison's 18th Ed. 2105

- A. Activated by allergens
- B. Initiate inflammatory response
- C. Release anti-inflammatory mediators
- D. None of the above

Macrophages are activated by allergens via low affinity IgE receptors (FcεRII). Macrophages initiate inflammatory response via release of certain cytokines. They also release anti-inflammatory mediators (IL-10).

160 In asthmatic patients, which of the following instructs dendritic cells to release chemokines that attract T_H2 cells into airways ?

Harrison's 18th Ed. 2105

- A. IL-12
- B. Tumor necrosis factor (TNF-α)
- C. Thymic stromal lymphopoietin (TSLP)
- D. All of the above

Dendritic cells take up allergens, process them to peptides, and migrate to local lymph nodes to present allergenic peptides to uncommitted T-lymphocytes for programming to allergen-specific T cells. Cytokine thymic stromal lymphopoietin (TSLP) released from epithelial cells in asthmatic patients instructs dendritic cells to release chemokines that attract T_H2 cells into airways.

161 Blocking antibodies to which of the following causes a profound and prolonged reduction in circulating and sputum eosinophils ?

Harrison's 18th Ed. 2105

- A. Interleukin-2
- B. Interleukin-4
- C. Interleukin-5
- D. Interleukin-13

Blocking antibodies to IL-5 causes a profound & prolonged reduction in circulating & sputum eosinophils, but is not associated with reduced AHR or asthma symptoms.

162 Which of the following cells predominate in normal airways ?

Harrison's 18th Ed. 2106

- A. T_H1
- B. T_H2
- C. T_H3
- D. T_H4

163 Which of the following cells predominate in asthmatics ?

Harrison's 18th Ed. 2106

- A. T_H1
- B. T_H2
- C. T_H3
- D. T_H4

164 Which of the following leads to eosinophilic inflammation in asthmatics ?

Harrison's 18th Ed. 2106

- A. IL-5
- B. IL-4

- C. IL-13
D. All of the above

The naïve immune system and immune system of asthmatics express T_H2 phenotype, whereas in normal airways T_H1 cells predominate. T_H2 cells, through the release of IL-5, are associated with eosinophilic inflammation and, through the release of IL-4 and IL-13, are associated with increased IgE formation.

165 Differentiation of Th1 cells depends on ?

N Engl J Med 2002;346:857

- A. Interleukin-12
B. Interleukin-4
C. Interferon- γ
D. All of the above

IL-10 & IL-12 are anti-inflammatory and may be deficient in asthma.

166 Differentiation of Th2 cells depends on ?

N Engl J Med 2002;346:857

- A. Interleukin-12
B. Interleukin-4
C. Interferon- γ
D. All of the above

167 Which of the following is not produced by Th2 cells ?

Harrison's 18th Ed. 2106, N Engl J Med 2001;344:30

- A. Interleukin-2
B. Interleukin-4
C. Interleukin-5
D. Interleukin-13

T_H2 cytokines IL-4, IL-5 & IL-13 mediate allergic inflammation, whereas proinflammatory cytokines tumor necrosis factor alpha and IL-1beta amplify the inflammatory response.

168 Which of the following in bronchial asthma is false ?

N Engl J Med 2002;346:857

- A. Interferon- γ from Th1 cells inhibits Th2 cells
B. Interleukin-4 from Th2 cells inhibits Th1 cells
C. Bronchial lymphocytes in asthma lack T-bet transcription factor
D. None of the above

169 Which of the following cytokines may be deficient in asthma ?

Harrison's 18th Ed. 2106

- A. IL-4
B. IL-5
C. IL-12
D. IL-13

Cytokines IL-10 & IL-12 are anti-inflammatory and may be deficient in asthma.

170 Which of the following is selectively attractant to eosinophils in asthmatics ?

Harrison's 18th Ed. 2106

- A. Eotaxin
B. Chemotaxin
C. Bronchotaxin
D. Pulmotaxin

Chemokine Eotaxin (CCL11), expressed by epithelial cells of asthmatics, is attractant to eosinophils via CCR3, whereas CCL17 (TARC) and CCL22 (MDC) from epithelial cells attract T_H2 cells via CCR4.

171 Stimulating factor for eosinophils is ?

Harrison's 16th Ed. 1509

- A. Interleukin 3
B. Interleukin 4
C. Interleukin 5
D. Interleukin 8

Interleukin 5 stimulates the release of eosinophils into the circulation & extends their survival.

172 Evidence for increased oxidative stress in asthma is provided by increased concentrations of which of the following in exhaled breath condensates ?

Harrison's 18th Ed. 2106

- A. 6-isoprostane
B. 7-isoprostane
C. 8-isoprostane
D. 9-isoprostane

Evidence for increased oxidative stress in asthma is provided by increased concentrations of 8-isoprostane (product of oxidized arachidonic acid) in exhaled breath condensates and increased ethane (product of lipid peroxidation) in the expired air of asthmatic patients.

173 In airways, Nitric Oxide (NO) is produced mainly by ?

Harrison's 18th Ed. 2106

- A. Epithelial cells
B. Fibroblasts
C. Smooth muscle
D. All of the above

Nitric oxide (NO) is produced by airway epithelial cells & macrophages in the airway by NO synthases. Its level in expired air of asthma patients is higher than normal due to eosinophilic inflammation.

174 Level of NO in expired air in asthma is related to ?

Harrison's 18th Ed. 2106

- A. Bronchoconstriction
B. Mucus Hypersecretion
C. Eosinophilic inflammation
D. Airway Hyperresponsiveness (AHR)

Nitric oxide (NO) is produced particularly by airway epithelial cells and macrophages. Its level NO in expired air in asthmatics is higher than normal and is related to eosinophilic inflammation.

175 Which of the following favours Th2 phenotype ?

Harrison's 17th Ed. 1600

- A. Transcription factor GATA-3
B. c-maf
C. Prostaglandin E2
D. All of the above

Proinflammatory transcription factors like nuclear factor κ B & activator protein 1 (AP-1) are activated in asthmatic airways leading to expression of multiple inflammatory genes. Specific transcription factor GATA-3 regulates expression of T_H2 cytokines in T cells.

176 Thunderstorm asthma is due to ?

Harrison's 18th Ed. 2108

- A. Fungal spores
B. Domestic pets
C. Pollen grains
D. Cockroaches

Pollens cause allergic rhinitis rather than asthma. In thunderstorms, pollen grains are disrupted & particles that are released can trigger severe asthma exacerbations (thunderstorm asthma).

177 Which of the following upper respiratory tract virus is the most common trigger of acute severe asthma exacerbation ?

Harrison's 18th Ed. 2108

- A. Rhinovirus
- B. Respiratory syncytial virus
- C. Coronavirus
- D. All of the above

Rhinovirus, respiratory syncytial virus, and coronavirus are the most common triggers of acute severe asthma exacerbations.

178 Cough associated with angiotensin-converting enzyme inhibitors best relates to ?

Harrison's 18th Ed. 2108

- A. Type I interferons
- B. Kinins
- C. Cysteinyl leukotrienes
- D. All of the above

Angiotensin-converting enzyme inhibitors inhibit breakdown of kinins, which are bronchoconstrictors and produce the characteristic cough.

179 Severity of exercise induced asthma depends on ?

Harrison's 18th Ed. 2108

- A. Level of ventilation achieved
- B. Temperature of environment
- C. Humidity of inspired air
- D. All of the above

EIA is worse in cold, dry climates than in hot, humid conditions.

180 Which of the following is false about exercise induced asthma (EIA) ?

Harrison's 18th Ed. 2108

- A. No long-term sequelae
- B. Does not increase airway reactivity
- C. Attacks follow exertion
- D. None of the above

181 Which of the following is false about exercise induced asthma (EIA) ?

Harrison's 18th Ed. 2108

- A. Begins after exercise has ended
- B. Recovers spontaneously within ~30 minutes
- C. Best prevented by inhaled glucocorticoids
- D. None of the above

182 Which of the following may also be a trigger of asthma ?

Harrison's 18th Ed. 2108

- A. Anger
- B. Orgasm
- C. Laughter
- D. All of the above

Laughter may also be a trigger of asthma.

183 Patients with aspirin-induced asthma may benefit from ?

Harrison's 18th Ed. 2108

- A. Salt free diet
- B. Pepper free diet

C. Salicylate free diet

D. Sulphar free diet

Patients with aspirin-induced asthma may benefit from a salicylate-free diet.

184 After what length of time, aspirin-induced asthma develops after drug administration ?

Harrison's 18th Ed. 436

- A. Within 1 hour
- B. Within 6 hours
- C. Within 12 hours
- D. Within 24 hour

Most NSAIDs, including aspirin, cause immediate, allergy-like symptoms in susceptible individuals. Urticaria/angioedema may be delayed up to 24 hours. The rhinosinusitis-asthma syndrome generally develops within 1 hour of drug administration.

185 Which of the following is supposedly protective for the occurrence of childhood-onset asthma ?

Harrison's 18th Ed. 1263

- A. M. tuberculosis
- B. Chlamydia trachomatis
- C. H. pylori
- D. All of the above

Recent studies have shown an inverse association of cagA⁺ H. pylori with childhood-onset asthma, hay fever, and atopic disorders. Whether H. pylori status is merely a marker or is causally associated with protection against these diseases remains to be determined.

186 Sulfur dioxide triggers asthma symptoms by ?

Harrison's 18th Ed. 2109

- A. Mast cell activation
- B. Adrenergic reflex
- C. Cholinergic reflex
- D. All of the above

Most of the triggers for asthma symptoms act indirectly. Allergens, exercise, hyperventilation, fog (via mast cell activation), irritant dusts, and sulfur dioxide (via a cholinergic reflex). Direct bronchoconstrictors are histamine & methacholine.

187 The characteristic symptom of asthma is ?

Harrison's 18th Ed. 2109

- A. Wheezing
- B. Dyspnea
- C. Coughing
- D. All of the above

The characteristic symptoms of asthma are wheezing, dyspnea & coughing.

188 Prodromal symptom that may precede an asthma attack is ?

Harrison's 18th Ed. 2109

- A. Itching under the axilla
- B. Itching over epigastrium
- C. Itching under the chin
- D. Itching behind the ears

Prodromal symptoms that may precede an asthma attack are itching under the chin, discomfort between scapulae or inexplicable fear (impending doom).

189 Which of the following symptoms is considered 'sine qua non' for asthma ?

Harrison's 16th Ed. 1511

- A. Dyspnea

- B. Cough
- C. Wheezing
- D. All of the above

190 Which of the following is most common & characteristic feature of asthma ?

Harrison's 16th Ed. 1511

- A. Cough
- B. Nocturnal awakening with dyspnea and/or wheeze
- C. Constriction feeling in chest
- D. Perspiration

191 Bronchial reactivity reaches its peak around ?

- A. 3 AM
- B. 6 AM
- C. 12 Noon
- D. 12 Midnight

192 Cough-variant asthma is seen in ?

Harrison's 18th Ed. 2109, 283

- A. Children
- B. Adolescents
- C. Adults
- D. Elderly

Cough due to asthma in the absence of wheezing, shortness of breath, and chest tightness is referred to as "cough-variant asthma." Children particularly may present with a predominant nonproductive cough or cough-variant asthma that ties the onset of cough to typical triggers for asthma and resolution of cough upon withdrawal from exposure to them. Cough-variant asthma typically responds well to inhaled glucocorticoids and intermittent use of inhaled beta-agonist bronchodilators.

193 Asthma is a feature of which of the following ?

Harrison's 18th Ed. 2793

- A. Cogan's Syndrome
- B. Polyarteritis Nodosa
- C. Churg-Strauss syndrome
- D. Henoch-Schönlein Purpura

Churg-Strauss syndrome (allergic angiitis & granulomatosis), is characterized by asthma, peripheral & tissue eosinophilia, extravascular granuloma formation, and vasculitis of multiple organ systems.

194 Asthma is related to which of the following ?

Harrison's 18th Ed. 2793

- A. Atopic dermatitis (AD)
- B. Allergic Contact Dermatitis (ACD)
- C. Seborrheic Dermatitis
- D. All of the above

Atopic dermatitis (AD) is the cutaneous expression of the atopic state, characterized by a family history of asthma, allergic rhinitis, or eczema.

195 Asthma is a feature of which of the following ?

Harrison's 18th Ed. 3062

- A. Zollinger-Ellison syndrome
- B. Verner-Morrison syndrome
- C. Carcinoid syndrome
- D. All of the above

Apart from flushing, diarrhea & cardiac manifestations, wheezing or asthma-like symptoms (8 - 18%) and pellagra-like skin lesions (2 - 25%) are also seen.

196 Flushing is a feature of which of the following ?

Harrison's 18th Ed. 3064

- A. Systemic mastocytosis
- B. Chronic myeloid leukemia
- C. Menopause
- D. All of the above

Flushing occurs in systemic mastocytosis, chronic myeloid leukemia with increased histamine release, menopause, reactions to alcohol or glutamate, side effects of chlorpropamide, calcium channel blockers, and nicotinic acid. None of these conditions cause increased urinary 5-HIAA.

197 Creola bodies are made up of ?

Harrison's 16th Ed. 1509

- A. Airway epithelium
- B. Airway smooth muscle
- C. Thick and stringy mucus
- D. All of the above

Airway epithelium which is sloughed into bronchial lumen appears in the form of Creola bodies.

198 Curschman's spirals in sputum is seen in ?

Harrison's 16th Ed. 1511

- A. Tubercular cavity
- B. Bronchial Asthma
- C. Bronchiectasis
- D. All of the above

199 Airflow limitation is represented by ?

Harrison's 18th Ed. 2109

- A. Reduced FEV₁
- B. Reduced FEV₁ / FVC ratio
- C. PEF
- D. All of the above

Airflow limitation is confirmed by reduced FEV₁, FEV₁/FVC ratio, and PEF.

200 At necropsy, in a case of acute asthma, feature not found is ?

Harrison's 16th Ed. 1511

- A. Gross overdistention of lungs
- B. Failure of lungs to collapse when pleural cavities are opened
- C. Gelatinous plugs of exudate in terminal bronchioles
- D. Destructive emphysema

Most conspicuous feature of lungs of asthma patients at necropsy is their gross overdistention, failure to collapse when pleural cavities are opened and numerous gelatinous plugs of exudate in most of the bronchial branches down to the terminal bronchioles.

201 In acutely ill asthmatic patient, residual volume is about ?

Harrison's 16th Ed. 1511

- A. 100 % of normal
- B. 250 % of normal
- C. 300 % of normal
- D. 400 % of normal

In acutely ill asthmatic patients, residual volume approaches 400% of normal, while functional residual capacity doubles.

202 Which of the following is found during acute exacerbation of asthma ?

Harrison's 16th Ed. 1511

- A. Hypoxia

- B. Hypocapnia
- C. Respiratory alkalosis
- D. All of the above

203 Ominous finding during acute exacerbation of asthma is ?

Harrison's 16th Ed. 1511

- A. Normal arterial carbon dioxide tension
- B. Metabolic acidosis
- C. Cyanosis
- D. All of the above

204 Which of the following indicate severe and prolonged bronchial obstruction in asthma ?

Harrison's 16th Ed. 1511

- A. High pitched wheezing
- B. Visibly active accessory muscles of respiration
- C. Paradoxical pulse
- D. All of the above

205 All of the following have relation with severity of asthma except ?

Harrison's 16th Ed. 1515

- A. Respiratory rate
- B. Pulsus paradoxus
- C. Inability to speak
- D. Use of accessory muscles of respiration

206 Reversibility of asthma is defined as ?

Harrison's 16th Ed. 1512

- A. $\geq 15\%$ increase in FEV_1 after 2 puffs of β agonists
- B. $> 15\%$ increase in FEV_1 after 4 puffs of β agonists
- C. $\geq 20\%$ increase in FEV_1 after 2 puffs of β agonists
- D. $> 20\%$ increase in FEV_1 after 4 puffs of β agonists

207 Reversibility of asthma is defined as an increase in FEV_1 15 minutes after inhaled short-acting β_2 -agonist of ?

Harrison's 18th Ed. 2109

- A. $> 12\%$ or 50 mL
- B. $> 12\%$ or 100 mL
- C. $> 12\%$ or 150 mL
- D. $> 12\%$ or 200 mL

Reversibility of asthma means a $>12\%$ or 200 mL increase in FEV_1 15 minutes after inhaled short-acting β_2 -agonist or, by a 2- to 4-week trial of oral glucocorticoids (prednisolone 30-40 mg daily).

208 In asthma, increased airway responsiveness (AHR) is measured by ?

Harrison's 18th Ed. 2109

- A. Carbon dioxide
- B. Nitric Oxide (NO)
- C. Methacholine
- D. All of the above

Increased airway responsiveness (AHR) is measured by methacholine or histamine challenge with calculation of provocative concentration that reduces FEV_1 by 20% (PC_{20}).

209 Aim of asthma therapy is to reduce peak expiratory flow (PEF) circadian variation to ?

Harrison's 18th Ed. 2110, Table 254-2

- A. $< 5\%$

- B. $< 10\%$
- C. $< 15\%$
- D. $< 20\%$

Aim of asthma therapy is to reduce PEF circadian variation to $< 20\%$.

210 Which of the following is used in the prevention of EIA ?

Harrison's 17th Ed. 1603

- A. Short-acting β_2 -agonists (SABAs)
- B. Inhaled Corticosteroids (ICSs)
- C. Cromolyn sodium
- D. All of the above

211 Which of the following may be associated with wheezing ?

Harrison's 18th Ed. 2109

- A. Eosinophilic pneumonias
- B. Polyarteritis nodosa
- C. Churg-Strauss syndrome
- D. All of the above

Eosinophilic pneumonias and systemic vasculitis, including Churg-Strauss syndrome and polyarteritis nodosa, may be associated with wheezing.

212 Which of the following is not a bronchodilator drug ?

Harrison's 18th Ed. 2110

- A. β_2 -adrenergic agonists
- B. Anticholinergics
- C. Inhaled Corticosteroids (ICSs)
- D. Theophylline

Three classes of bronchodilators are β_2 -adrenergic agonists, anticholinergics & theophylline.

213 Which of the following is related to β_2 -agonists ?

Harrison's 18th Ed. 2110

- A. G protein
- B. Adenylyl cyclase
- C. Cyclic adenosine monophosphate (AMP)
- D. All of the above

β_2 -agonists activate β_2 -adrenergic receptors which are coupled through a stimulatory G protein to adenylyl cyclase, resulting in increased intracellular cyclic adenosine monophosphate (AMP), which relaxes smooth muscle cells.

214 Actions of β_2 -agonists include all except ?

Harrison's 18th Ed. 2110

- A. Reduction in airway hyperresponsiveness (AHR)
- B. Inhibition of mast cell mediator release
- C. Reduction in plasma exudation
- D. Inhibition of sensory nerve activation

In contrast to corticosteroids, β_2 -agonist have no effects on inflammatory cells in airways and there is no reduction in AHR.

215 Which of the following about β_2 -agonists is false ?

Harrison's 18th Ed. 2110

- A. SABAs are useful in preventing EIA
- B. LABAs should not be given without ICSs
- C. Mast cell tolerance prevented by concomitant ICSs
- D. None of the above

216 Theophylline activates which of the following ?*Harrison's 18th Ed. 2111*

- A. Growth factor - related receptor tyrosine kinase
- B. Histone deacetylase-2
- C. DNA methyltransferase
- D. All-trans-retinoic acid (ATRA)

Theophylline activates key nuclear enzyme histone deacetylase-2, which is a critical mechanism for switching off activated inflammatory genes.

217 Nausea, vomiting & headaches produced by theophylline are due to ?*Harrison's 18th Ed. 2111*

- A. Adenosine receptor antagonism
- B. Phosphodiesterase inhibition
- C. Muscarinic receptor antagonism
- D. All of the above

Nausea, vomiting & headaches produced by theophylline are due to phosphodiesterase inhibition.

218 Cardiac arrhythmias produced by theophylline is due to ?*Harrison's 18th Ed. 2111*

- A. Adenosine A1 receptor antagonism
- B. Phosphodiesterase inhibition
- C. Muscarinic receptor antagonism
- D. All of the above

Theophylline side effects like cardiac arrhythmias & epileptic seizures occur due to adenosine A1 receptor antagonism.

219 Theophylline side effects are rare at plasma concentrations below ?*Harrison's 18th Ed. 2111*

- A. 10 mg/L
- B. 20 mg/L
- C. 30 mg/L
- D. 40 mg/L

Theophylline side effects are rare at plasma concentrations < 10 mg/L.

220 Therapeutic plasma concentration of theophylline is ?*Harrison's 16th Ed. 1513*

- A. 5 - 15 µg/mL
- B. 20 - 40 µg/mL
- C. 5 - 15 µg/mL
- D. 20 - 40 µg/mL

221 Plasma concentrations of theophylline may be elevated by ?*Harrison's 18th Ed. 2111, Table 254-4*

- A. Erythromycin
- B. Ciprofloxacin
- C. Zafirlukast
- D. All of the above

Theophylline is metabolized by CYP450 in liver. Its plasma concentrations may be elevated by drugs like erythromycin, allopurinol, cimetidine, ciprofloxacin, zileuton, zafirlukast.

222 All of the following drugs increase theophylline level except ?*Harrison's 16th Ed. 1513*

- A. Rifampin

- B. Erythromycin
- C. Ciprofloxacin
- D. Cimetidine

223 All of the following drugs increase theophylline level except ?*Harrison's 16th Ed. 1513*

- A. Allopurinol
- B. Propranolol
- C. Cephalosporins
- D. Phenytoin

224 Which of the following does not belong to the controller therapy of asthma ?*Harrison's 18th Ed. 2111*

- A. Long-acting beta₂-agonists (LABAs)
- B. Inhaled corticosteroids (ICSs)
- C. Cromolyn sodium
- D. Antileukotrienes

Drugs for asthma are divided into bronchodilators & controllers. Bronchodilators provide rapid relief of symptoms through relaxation of airway smooth muscle, while controllers inhibit inflammatory process.

225 Which of the following is an action of corticosteroids in asthma ?*Harrison's 18th Ed. 2111*

- A. Inhibition of transcription factor NF-κB
- B. Inhibition of transcription factor activator protein (AP)-1
- C. Recruitment of histone deacetylase-2 (HDAC2) to inflammatory gene complex
- D. All of the above

226 First-line therapy for patients with persistent asthma is ?*Harrison's 18th Ed. 2111*

- A. Beta₂-adrenergic agonists
- B. Anticholinergics
- C. Inhaled Corticosteroids (ICSs)
- D. Theophylline

ICSs are the first-line therapy for persistent asthma. If symptoms are not controlled, LABA is added.

227 Which of the following is a major problem in therapy with intramuscular triamcinolone acetonide ?*Harrison's 18th Ed. 2112*

- A. Osteoporosis
- B. Depression
- C. Cataracts
- D. Proximal myopathy

Proximal myopathy is a major problem with intramuscular triamcinolone acetonide therapy.

228 In asthma, cysteinyl-leukotrienes are produced mainly by ?*Harrison's 18th Ed. 2112*

- A. Mast cells
- B. Neutrophils
- C. Macrophages
- D. Basophils

Cysteinyl-leukotrienes are produced predominantly by mast cells in asthma.

229 Antileukotrienes (montelukast & zafirlukast) block which of the following ?

Harrison's 18th Ed. 2112

- A. cys-LT₁-receptors
- B. cys-LT₂-receptors
- C. cys-LT₃-receptors
- D. All of the above

Cysteinyl-leukotrienes are potent bronchoconstrictors, cause microvascular leakage, and increase eosinophilic inflammation through activation of cys-LT₁-receptors. Antileukotrienes (montelukast & zafirlukast) block cys-LT₁-receptors.

230 Which of the following medicine is used as steroid-sparing therapy ?

Harrison's 18th Ed. 2112

- A. Methotrexate
- B. Cyclosporin A
- C. IV gamma globulin
- D. All of the above

Immunomodulators have been used to reduce requirement for OCS in patients with severe asthma. Methotrexate, cyclosporin A, azathioprine, gold, and IV gamma globulin are used as steroid-sparing therapies, but none of these treatments has any long-term benefit and each is associated with a relatively high risk of side effects.

231 Anti IgE monoclonal antibody used in bronchial asthma is ?

N Engl J Med 2006;354:2689-95

- A. Mepolizumab
- B. Omalizumab
- C. Keliximab
- D. Altrakincept

Humanized anti-IgE monoclonal antibody omalizumab blocks IgE. Approved for persistent allergic asthma not controlled by inhaled glucocorticoid therapy.

232 Omalizumab is given in bronchial asthma by which route ?

N Engl J Med 2006;354:2689-95

- A. Subcutaneous
- B. Intravenous
- C. Intramuscular
- D. Aerosol

Omalizumab is usually given as a subcutaneous injection every 2 - 4 weeks.

233 Which of the following about Omalizumab is false ?

N Engl J Med 2006;354:2689-95

- A. Recombinant humanized IgG1 monoclonal anti-IgE antibody
- B. Not anaphylactogenic
- C. Total serum IgE levels will increase during treatment
- D. None of the above

Omalizumab is a recombinant humanized IgG1 monoclonal anti-IgE antibody that binds to IgE molecule at the same epitope on Fc that binds to FcεRI. It is not anaphylactogenic since it cannot interact with IgE that is already bound to cell surfaces and cannot induce degranulation of mast cells or basophils. Omalizumab binds to circulating IgE forming small, biologically inert IgE - anti-IgE complexes without activating complement cascade.

234 Omalizumab cannot be given if the total IgE is ?

BMJ 2009;338:b494

- A. > 100 IU/L
- B. > 300 IU/L
- C. > 500 IU/L

D. > 700 IU/L

Omalizumab cannot be given if the total IgE is > 700 IU/L, which effectively excludes highly atopic patients. Recommended dose is 0.016 mg /per kg body weight per international unit of IgE every four weeks, administered subcutaneously at either two-week or four-week intervals. Dose is based on estimated amount of drug that is required to reduce circulating free IgE levels to < 10 IU/mL.

235 Speleotherapy is best related to ?

- A. Mountain
- B. Lagoon
- C. Cave
- D. Iceberg

Speleotherapy comes from a Greek word meaning cave. Speleotherapy was first formulated by Polish physician F. Bochkowsky who noticed that salt miners had a very low incident of respiratory diseases.

236 How frequent use of a reliever medication indicates the need for regular controller therapy ?

Harrison's 18th Ed. 2113

- A. > once a week
- B. > three times a week
- C. > five times a week
- D. > seven times a week

Use of a reliever medication > three times a week indicates need for regular controller therapy.

237 The mainstay of treatment in acute severe asthma is ?

Harrison's 18th Ed. 2113

- A. High dose short-acting inhaled beta₂-agonists
- B. High dose inhaled corticosteroids (ICSs)
- C. Intravenous beta₂-agonists
- D. Intravenous corticosteroids

The mainstay of treatment is high doses of short-acting inhaled Beta₂-agonists.

238 Treatment of choice in severely ill asthma patients with impending respiratory failure is ?

Harrison's 18th Ed. 2113

- A. High dose short-acting inhaled beta₂-agonists
- B. High dose inhaled corticosteroids (ICSs)
- C. Intravenous beta₂-agonists
- D. Intravenous corticosteroids

In severely ill patients with impending respiratory failure, intravenous Beta₂-agonists may be given.

239 Refractory asthma is defined as difficult to control asthma despite ?

Harrison's 18th Ed. 2113

- A. Maximal inhaled therapy
- B. Maximal inhaled + oral therapy
- C. Maximal inhaled + oral + IV therapy
- D. All of the above

Approximately 5% of asthmatics are difficult to control despite maximal inhaled therapy.

240 The most common reason for poor control of asthma is ?

Harrison's 18th Ed. 2114

- A. Continued exposure to allergens
- B. Use of cyclooxygenase (COX) inhibitors
- C. Noncompliance with medication

- D. Gastroesophageal reflux

Most common reason for poor control of asthma is noncompliance with medication (ICS).

241 Premenstrual worsening of asthma is treated by ?

Harrison's 18th Ed. 2114

- A. Corticosteroids
B. Progesterone
C. Oestrogen
D. Anticholinergics

Severe premenstrual worsening of asthma, unresponsive to corticosteroids requires treatment with progesterone or gonadotropin-releasing factors.

242 Corticosteroid resistant asthma is defined as failure to respond to what dose & duration of oral prednisolone ?

Harrison's 18th Ed. 2114

- A. 40 mg OD for 2 weeks
B. 60 mg OD for 2 weeks
C. 80 mg OD for 2 weeks
D. 100 mg OD for 2 weeks

Corticosteroid resistant asthma is defined as failure to respond to 40 mg OD for 2 weeks of oral prednisolone.

243 Mechanism of corticosteroid resistant asthma may be ?

Harrison's 18th Ed. 2114

- A. Excess of transcription factor AP-1
B. Increase in glucocorticoid receptor (GR)- β
C. Reduction in histone deacetylase activity
D. All of the above

Mechanism of corticosteroid resistant asthma may be excess of transcription factor AP-1, increase in glucocorticoid receptor- β , abnormal pattern of histone acetylation in response to corticosteroids, defect in IL-10 production and reduction in histone deacetylase activity.

244 Treatment of choice in type 2 brittle asthma is ?

Harrison's 18th Ed. 2114

- A. Oral corticosteroids
B. Continuous infusion of β_2 -agonists
C. Continuous infusion of corticosteroids
D. Subcutaneous epinephrine

Type I brittle asthma - chaotic variations in lung function despite appropriate therapy. Some show a persistent pattern of variability and may require oral corticosteroids or, at times, continuous infusion of β_2 -agonists. Type II brittle asthma - normal or near-normal lung function but precipitous, unpredictable falls in lung function that may result in death, do not respond well to corticosteroids and inhaled bronchodilators, most effective therapy is subcutaneous epinephrine.

245 Aspirin sensitive asthma is associated with ?

Harrison's 18th Ed. 2115

- A. Extrinsic asthma
B. Urticaria
C. Nasal polyp
D. Obesity

Aspirin-sensitive asthma is a well-defined subtype of late onset asthma that is preceded by perennial rhinitis & nasal polyps in nonatopic patients.

246 In aspirin sensitive asthma, which of the following drugs is not well tolerated ?

Harrison's 16th Ed. 1510

- A. Acetaminophen

- B. Sodium salicylate
C. Naproxen
D. Propoxyphene

Aspirin-sensitive asthma responds to usual therapy with an ICS.

247 Drugs for asthma that are safe and without teratogenic potential include all except ?

Harrison's 18th Ed. 2115

- A. Short-acting β_2 -agonists
B. Long-acting β_2 -agonists
C. ICSs
D. Theophylline

Drugs for asthma that are safe and without teratogenic potential include SABAs, ICSs & theophylline. There is less safety information about LABAs, antileukotrienes & anti-IgE.

248 Early onset bronchial asthma is associated with all except ?

Harrison's 16th Ed. 1508

- A. Rhinitis
B. Family history of urticaria
C. Personal history of eczema
D. Normal levels of IgE in serum

249 Heightened airway responsiveness in bronchial asthma can be demonstrated by the use of ?

Harrison's 16th Ed. 1512

- A. Histamine
B. Methacholine
C. Isocapnic hyperventilation of cold air
D. All of the above

250 When sleep disruption is a prominent side effect of asthma treatment, which drug is preferred ?

Harrison's 18th Ed. 218

- A. Theophylline sustained release preparations
B. Inhaled beclomethasone
C. Inhaled Adrenergic agonists
D. Oral glucocorticoids

Prominent daily variation in airway resistance in asthmatics results in marked increases in asthmatic symptoms at night, especially during sleep. Treatment with theophylline, adrenergic agonists or glucocorticoids can independently disrupt sleep. When sleep disruption is a side effect of asthma treatment, inhaled glucocorticoids (beclomethasone) that do not disrupt sleep may be useful.

251 Most successful means of bronchial asthma management is ?

Harrison's 16th Ed. 1512

- A. Glucocorticoids
B. Glucocorticoids + β_2 agonists
C. Desensitization / Immunotherapy
D. Elimination of provocative agent

252 Bronchial asthma occurring in women at specific predictable time during menstrual cycle is called ?

- A. Functional asthma
B. Periodic asthma
C. Mittelschmerz asthma
D. Catamenial asthma

253 All are "quick relief medications" for bronchial asthma except ?

Harrison's 16th Ed. 1512

- A. β adrenergic agonists
- B. Methylxanthines
- C. Anticholinergics
- D. Glucocorticoids

"Quick relief medications" for bronchial asthma are β -adrenergic agonists, methylxanthines and anticholinergics.

254 All are "long-term control medications" for bronchial asthma except ?

Harrison's 16th Ed. 1512

- A. Glucocorticoids
- B. All β adrenergic agonists
- C. Mast cell stabilizing agents
- D. Leukotriene modifiers

"Long-term control medications" for bronchial asthma are glucocorticoids, long-acting β 2-agonists, combined medications, mast cell stabilizing agents, leukotriene modifiers and methylxanthines.

255 Which of the following is a bronchodilator ?

Harrison's 17th Ed. 1602

- A. β_2 -adrenergic agonists
- B. Anticholinergics
- C. Theophylline
- D. All of the above

Three classes of bronchodilator are β_2 -adrenergic agonists, anticholinergics & theophylline.

256 Non-bronchodilator effect of beta-2 agonists is ?

Harrison's 17th Ed. 1602

- A. Inhibition of mast cell mediator release
- B. Reduction in plasma exudation
- C. Inhibition of sensory nerve activation
- D. All of the above

Non-bronchodilator effects of beta-2 agonists are inhibition of mast cell mediator release, reduction in plasma exudation & inhibition of sensory nerve activation.

257 Which of the following about asthma treatment is false ?

Harrison's 17th Ed. 1602

- A. Increased use of SABAs means asthma is not controlled
- B. LABAs do not control underlying inflammation
- C. LABAs should not be given without ICS therapy
- D. None of the above

258 Adrenergic stimulants include ?

Harrison's 16th Ed. 1512

- A. Catecholamines
- B. Resorcinols
- C. Saligenins
- D. All of the above

259 Which of the following is a resorcinol ?

Harrison's 16th Ed. 1512

- A. Isoetharine
- B. Terbutaline

C. Fenoterol

D. Albuterol

260 Which of the following is a saligenin ?

Harrison's 16th Ed. 1512

- A. Isoetharine
- B. Terbutaline
- C. Fenoterol
- D. Albuterol

261 Which of the following catecholamines can be given by routes other than inhalational or parenteral ?

Harrison's 16th Ed. 1512

- A. Epinephrine
- B. Isoproterenol
- C. Isoetharine
- D. None of the above

262 Major side effect of β_2 adrenergic agonists is ?

Harrison's 16th Ed. 1512

- A. Tachycardia
- B. Hyperglycemia
- C. Tremors
- D. Hypertension

263 In patients of bronchial asthma with coexistent heart disease, which of the following drugs is preferred ?

Harrison's 16th Ed. 1513

- A. Anticholinergic drugs
- B. Methylxanthines
- C. β adrenergic stimulants
- D. None of the above

264 Which of the following is a nonstandard bronchodilator ?

Harrison's 16th Ed. 1514

- A. Magnesium sulfate
- B. Methotrexate
- C. Gold salts
- D. Colchicine

265 Which of the traditional medicine was used in the treatment of asthma ?

Harrison's 18th Ed. Chapter e2

- A. Ginkgo biloba
- B. Ma huang
- C. Hypericum perforatum
- D. All of the above

Ephedra sinica, or ma huang, a product used in traditional Chinese medicine was used for short-term treatment of asthma and bronchial congestion.

266 Which of the following promotes histamine release from tissue mast cells & may worsen bronchospasm in patients with asthma ?

Harrison's 18th Ed. 2211

- A. Ketamine
- B. Morphine

- C. Fentanyl
- D. Propofol

Morphine can promote histamine release from tissue mast cells and may worsen bronchospasm in patients with asthma.

267 The most potent anti-inflammatory agent available for bronchial asthma is ?

Harrison's 16th Ed. 1513

- A. Glucocorticoids
- B. Nedocromil
- C. Ketotifen
- D. Zafirlucast

268 Oral and intravenous administration produces the same effect in case of ?

Harrison's 16th Ed. 1513

- A. Methylprednisolone
- B. Prednisolone
- C. Prednisone
- D. Hydrocortisone

269 The 5-lipoxygenase inhibitor used in asthma is ?

Harrison's 18th Ed. 44

- A. Bupropion
- B. Zolpidem
- C. Zileuton
- D. Zafirlucast

270 "Balance oxygen" used for treatment of severe airway obstruction is ?

Harrison's 16th Ed. 1515

- A. 70 - 80 % Hydrogen
- B. 70 - 80 % Nitrogen
- C. 70 - 80 % Oxygen
- D. 70 - 80 % Helium

Treatment with 70 to 80% helium (balance oxygen) may be beneficial in severe airway obstruction.

271 Which is a "Soft steroid" used in bronchial asthma ?

- A. Budesonide
- B. Flunisolide
- C. Ciclesonide
- D. Dexamethasone

272 Potassium channel opener used in bronchial asthma is ?

- A. Levromakalim
- B. Nicorandil
- C. Minoxidil
- D. All of the above

273 Atrial Natriuretic Peptide (ANP) analogue used in bronchial asthma is ?

- A. Urodilatin
- B. Nesiritide
- C. Ariflo
- D. Roflumilast

274 Phosphodiesterase inhibitors used in bronchial asthma are all except ?

- A. Ariflo
- B. Roflumilast
- C. Urodilatin
- D. Cilostazol

275 Monoclonal antibody to IL-5 is ?

- A. Mepolizumab
- B. Omalizumab
- C. Keliximab
- D. Altrakincept

276 Anti CD 4 monoclonal antibody used in bronchial asthma is ?

BMJ 2009;338:b494

- A. Mepolizumab
- B. Omalizumab
- C. Gomilumab
- D. Altrakincept

Gomilumab is a humanised monoclonal antibody against tumour necrosis factor.

277 Immunomodulators used in bronchial asthma are ?

- A. Mycophenolate mofetil
- B. Leflunomide
- C. Brequinar sodium
- D. All of the above

278 Which oral β agonist is administered once daily in bronchial asthma ?

- A. Albuterol
- B. Bambuterol
- C. Formoterol
- D. Salmeterol

279 Pneumococcal polysaccharide (PPSV) vaccination is indicated for patients with ?

Harrison's 18th Ed. 1034

- A. Asthma
- B. Nephrotic syndrome
- C. Cirrhosis
- D. All of the above

Pneumococcal polysaccharide (PPSV) vaccination is indicated for patients with chronic lung disease (including asthma), chronic cardiovascular diseases, diabetes mellitus, chronic liver diseases; cirrhosis, chronic alcoholism, sickle cell disease, splenectomy, chronic renal failure, nephrotic syndrome) and cochlear implants and cerebrospinal fluid leaks.

255 - Hypersensitivity Pneumonitis & Pulmonary Infiltrates with Eosinophilia

280 Hypersensitivity pneumonitis (HP) is also called ?

Harrison's 18th Ed. 2116

- A. Extrinsic allergic alveolitis
- B. Intrinsic allergic alveolitis
- C. Immunologic alveolitis

D. Decaying alveolitis

Hypersensitivity pneumonitis (HP) is also called extrinsic allergic alveolitis. Eosinophilia is not a feature of HP.

281 Hypersensitivity pneumonitis (HP) is also called ?

Harrison's 18th Ed. 2116

- A. Gardener's lung
- B. Mountain lung
- C. Farmer's lung
- D. Pollen lung

Term "Farmer's lung" is used for HP due to inhalation of antigens present in moldy hay, such as thermophilic actinomyces, Micropolyspora faeni, and Aspergillus species.

282 Hot tub lung is best related to ?

Harrison's 18th Ed. 2116

- A. Molds in air conditioners or humidifiers
- B. Isocyanates
- C. Mycobacterium avium complex
- D. Cigarette smoking

Hot tub lung refers to a hypersensitivity reaction to Mycobacterium avium complex, which is present in hot tubs or whirlpools and is differentiated from actual infection.

283 The clinical presentation of HP can be ?

Harrison's 18th Ed. 2116

- A. Acute
- B. Subacute
- C. Chronic
- D. Any of the above

The clinical presentation of HP can be acute, subacute, or chronic.

284 In acute HP, symptoms occur within how many hours after exposure to antigen ?

Harrison's 18th Ed. 2116

- A. 6 to 8 hours
- B. 12 to 24 hours
- C. 24 to 48 hours
- D. 48 to 72 hours

In acute HP, symptoms (cough, fever, chills, malaise, dyspnea) occur 6 to 8 hours after exposure to antigen and usually clear within a few days if there is no further exposure to antigen.

285 Which of the following is false about acute hypersensitivity pneumonitis (HP) ?

Harrison's 18th Ed. 2118

- A. Neutrophilia
- B. Eosinophilia
- C. Lymphopenia
- D. Presence of rheumatoid factor

Following acute exposure to antigen, neutrophilia & lymphopenia are present. Eosinophilia is not a feature. Raised ESR, C-reactive protein, rheumatoid factor, and serum immunoglobulins also occur.

286 Abnormality rarely seen in chest X-Ray of HP patient is ?

Harrison's 18th Ed. 2118

- A. Diffuse reticulonodular infiltrate
- B. Honeycombing
- C. Pleural effusion

D. Apical sparing

CxR abnormalities rarely seen in HP are pleural effusion or thickening and hilar or mediastinal LNopathy.

287 Which of the following can be found in BAL of HP patients ?

Harrison's 18th Ed. 2118

- A. Lymphocytic alveolitis
- B. Alveolar neutrophilia
- C. Bronchoalveolar mastocytosis
- D. All of the above

BAL in HP patients shows marked lymphocytic alveolitis, alveolar neutrophilia in acute cases and bronchoalveolar mastocytosis.

288 Which of the following is false in lung biopsy of HP patients ?

Harrison's 18th Ed. 2118

- A. Mononuclear bronchiolitis
- B. Interstitial infiltrates of lymphocytes & plasma cells
- C. Necrotizing granulomas
- D. Thickened interstitium

Granulomas in HP are nonnecrotizing.

289 The most important tool in diagnosing HP is ?

Harrison's 18th Ed. 2119

- A. Pulmonary function tests
- B. Radiographic tests
- C. BAL
- D. High index of suspicion

Most important tool in diagnosing HP is high index of suspicion.

290 Which of the following about Organic dust toxic syndrome is false ?

Harrison's 18th Ed. 2119

- A. More common than HP
- B. Follows heavy exposure to organic dusts
- C. Transient fever & muscle aches
- D. None of the above

291 Which of the following about Organic dust toxic syndrome is false ?

Harrison's 18th Ed. 2119

- A. Serum precipitins are absent
- B. Chest x-ray is usually normal
- C. Self-limited disorder without long-term sequelae
- D. None of the above

Organic dust toxic syndrome (ODTS) is more common than HP. It follows heavy exposure to organic dusts. Transient fever & muscle aches, with or without dyspnea & cough occur. Serum precipitins are absent, CxR is normal. ODTS is a self-limited disorder without significant long-term sequelae.

292 Tropical eosinophilia is usually caused by ?

Harrison's 18th Ed. 2120

- A. Wuchereria bancrofti
- B. Ascaris
- C. Ancylostoma
- D. Strongyloides stercoralis

Tropical eosinophilia is caused by filarial infection (Wuchereria bancrofti or W. malayi). It is treated successfully with diethylcarbamazine. Eosinophilic pneumonias also occur with Ascaris, Ancylostoma sp., Toxocara sp. & Strongyloides stercoralis.

293 Drug-induced eosinophilic pneumonias can be caused by ?

Harrison's 18th Ed. 2120

- A Nitrofurantoin
- B. Sulfonamides
- C. Penicillin
- D. All of the above

294 Drug-induced eosinophilic pneumonias can be caused by ?

Harrison's 18th Ed. 2120

- A Thiazides
- B. Tricyclic antidepressants
- C. Isoniazid
- D. All of the above

Drug-induced eosinophilic pneumonias can be caused by nitrofurantoin, sulfonamides, penicillin, chlorpropamide, thiazides, tricyclic antidepressants, hydralazine, gold salts, isoniazid, indomethacin.

295 BAL fluid of normal nonsmoker individual, percentage of eosinophils is ?

Harrison's 18th Ed. 2120

- A < 2 %
- B. < 4 %
- C. < 6 %
- D. < 8 %

BAL fluid of normal nonsmoker individual, percentage of eosinophils is less than 2 %.

296 In diagnosis of hypereosinophilic syndrome, eosinophil count should be over ?

Harrison's 18th Ed. 2120

- A 1000 / μ L of peripheral blood for 3 months or longer
- B. 1500 / μ L of peripheral blood for 3 months or longer
- C. 1000 / μ L of peripheral blood for 6 months or longer
- D. 1500 / μ L of peripheral blood for 6 months or longer

Hypereosinophilic syndrome is characterized by presence of >1500 eosinophils per microliter of peripheral blood for 6 months or longer.

297 In hypereosinophilic syndrome, the cardiac abnormality is ?

Harrison's 18th Ed. 2120

- A Tricuspid valve abnormalities
- B. Endomyocardial fibrosis
- C. Restrictive, biventricular cardiomyopathy
- D. All of the above

298 Besides lung, which other organ is involved in allergic angiitis and granulomatosis of Churg and Strauss ?

Harrison's 16th Ed. 1520

- A Skin
- B. Kidney
- C. Nervous system
- D. All of the above

299 In asthma, use of which of the following drugs is associated with Churg-Strauss syndrome ?

Harrison's 16th Ed. 1520

- A Beta agonists
- B. Chromolyns

C. Leukotriene-modifying agents

D. Anticholinergics

300 Most common route of entry of aspergillus spores is ?

N Engl J Med 2009;360:1870-84

- A Inhalation
- B. Ingestion
- C. Urinary tract
- D. Skin

Invasive aspergillosis principally involves sinopulmonary tract. Inhalation is the most common route of entry of aspergillus spores.

301 Invasive aspergillosis of lung tissue is found in ?

Harrison's 16th Ed. 1188

- A Granulocyte count in peripheral blood of <500/uL
- B. Treatment with supraphysiologic doses of glucocorticoids
- C. History of treatment with cytotoxic drugs
- D. All of the above

302 Aspergillus infection in a neutropenic patient is characterized by ?

Harrison's 16th Ed. 1188

- A Hyphal invasion of blood vessels
- B. Thrombosis, necrosis
- C. Hemorrhagic infarction
- D. All of the above

303 Term allergic bronchopulmonary aspergillosis (ABPA) denotes the condition of patients with preexisting asthma who have ?

Harrison's 17th Ed. 1610 Table 249-3

- A Eosinophilia
- B. IgE antibody to Aspergillus
- C. Fleeting pulmonary infiltrates from bronchial plugging
- D. All of the above

Main diagnostic criteria of Allergic Bronchopulmonary Aspergillosis (ABPA) include bronchial asthma, pulmonary infiltrates, peripheral eosinophilia (>1000/ μ L), immediate wheal-and-flare response to A fumigatus, serum precipitins to A. fumigatus, elevated serum IgE and central bronchiectasis.

304 Endobronchial saprophytic pulmonary aspergillosis presents in a patient with prior ?

Harrison's 16th Ed. 1188

- A Pulmonary tuberculosis
- B. Sarcoidosis
- C. Histoplasmosis
- D. All of the above

305 In allergic bronchopulmonary aspergillosis (ABPA), fleeting eosinophilic infiltrates involve which lobes of lung ?

Harrison's 17th Ed. 1606

- A Upper lobes
- B. Middle lobes
- C. Lower lobes
- D. Any of the above

In ABPA, fleeting eosinophilic infiltrates typically involve upper lobes of lungs.

306 The earliest CT finding in invasive aspergillosis is ?

Harrison's 16th Ed. 1188

- A Pulmonary nodules

- B. Pulmonary infiltrate
- C. Pleural effusion
- D. Pneumothorax

307 Halo sign & crescent sign are radiological findings in ?

N Engl J Med 2009;360:1870-84, Harrison's 16th Ed. 1189

- A. Invasive aspergillosis of the lung
- B. Bronchiectasis
- C. Bronchogenic carcinoma
- D. Atelectasis

Earliest radiologic sign of invasive aspergillosis is a nodule. "Halo sign" is defined as a macronodule surrounded by a perimeter of ground-glass opacity corresponding to alveolar hemorrhage.

308 Detection of galactomannan antigen in serum suggests the diagnosis of ?

Harrison's 16th Ed. 1189

- A. Invasive aspergillosis of the lung
- B. Bronchiectasis
- C. Bronchogenic carcinoma
- D. Atelectasis

Antigen-based diagnosis relies on serum detection of either galactomannan or beta-D-glucan, two constituents of fungal-cell walls.

309 Which of the following can give false positive results for galactomannan antigen ?

N Engl J Med 2009;360:1870-84

- A. Concomitant use of piperacillin-tazobactam antibiotic
- B. Concomitant use of beta-lactam antibiotic
- C. Gluconate containing IV fluids
- D. All of the above

False positive results for galactomannan antigen are due to concomitant use of piperacillin-tazobactam, other beta-lactam antibiotics, and gluconate containing IV fluids.

310 Drug of choice as primary therapy for invasive aspergillosis is ?

N Engl J Med 2009;360:1870-84

- A. Posaconazole
- B. Itraconazole
- C. Voriconazole
- D. Amphotericin B

Drug of choice as primary therapy for invasive aspergillosis is Voriconazole. 6 mg/kg IV BD for 2 doses, then 4 mg/kg BD as initial therapy. Oral therapy for adults - 200 mg BD or 4 mg/kg BD.

311 Which of the following is an "Echinocandin" ?

N Engl J Med 2009;360:1870-84

- A. Caspofungin
- B. Micafungin
- C. Anidulafungin
- D. All of the above

Fungal beta-glucans are ubiquitous cell-wall constituents of fungi and trigger inflammatory responses in macrophages through their exposure on surface of germinating aspergillus conidia. Dectin-1 and TLR2 recognize distinct beta-glucan motifs and stimulate proinflammatory cytokine production. Echinocandins are antifungal agents acting on the cell wall by inhibiting beta-glucan synthesis.

312 Drugs for treatment of aspergillosis include ?

Harrison's 16th Ed. 1189

- A. IV amphotericin B

- B. Liposomal amphotericin B
- C. Itraconazole
- D. All of the above

313 Drugs for treatment of aspergillosis include ?

Harrison's 16th Ed. 1189

- A. Intravenous voriconazole
- B. Intravenous caspofungin
- C. Itraconazole
- D. All of the above

314 Which of the following is not effective in treatment of aspergillosis ?

Harrison's 17th Ed. 1243

- A. Fluconazole
- B. Voriconazole
- C. Caspofungin
- D. Itraconazole

Fluconazole is not effective for the treatment of aspergillosis

Chapter 256. Occupational and Environmental Lung Disease

315 "Fugitive dust" includes ?

Harrison's 16th Ed. 1521

- A. Pollens
- B. Windblown dust
- C. Dust from mechanical industrial processes
- D. All of the above

316 Particles below what size can be carried to lower airways ?

Harrison's 18th Ed. 2122

- A. 10 μm
- B. 7.5 μm
- C. 5 μm
- D. 2.5 μm

Respirable particles that can deposit & be carried to lower airways, is of the size <2.5 μm (fine-mode fraction).

317 Coarse-mode fraction contains particles of what size ?

Harrison's 18th Ed. 2122

- A. ~ 2.5 - 10 μm
- B. ~ 10 - 19.9 μm
- C. ~ 20 - 20.9 μm
- D. ~ 30 - 30.9 μm

Particles of silica, aluminum and iron are of the size of ~2.5 - 10 μm and represent coarse-mode fraction. They mostly deposit in tracheobronchial tree.

318 Asbestos includes ?

Harrison's 18th Ed. 2122

- A. Chrysotile
- B. Amosite
- C. Crocidolite

- D. All of the above

Asbestos is a generic term for mineral silicates like chrysotile, amosite, anthophyllite & crocidolite.

319 Major health effect from exposure to asbestos is ?

Harrison's 18th Ed. 2123

- A. Pleural fibrosis
- B. Diffuse interstitial pulmonary fibrosis
- C. Cancers of respiratory tract, pleura & peritoneum
- D. All of the above

Major health effects from asbestos exposure are pleural & diffuse interstitial pulmonary fibrosis & cancers of respiratory tract, pleura and rarely peritoneum.

320 The clinical & pathological features of acute silicosis are similar to those of ?

Harrison's 18th Ed. 2124

- A. ABPA
- B. Asthma
- C. Acute pneumonitis
- D. Pulmonary alveolar proteinosis

Clinical & pathological features of acute silicosis are similar to those of pulmonary alveolar proteinosis.

321 "Crazy paving" HRCT pattern is characteristic of ?

Harrison's 18th Ed. 2124 Figure 256-2

- A. Asbestosis
- B. Berylliosis
- C. Silicosis
- D. Coal worker's pneumoconiosis (CWP)

Silicosis chest radiograph shows profuse miliary infiltration or consolidation and "crazy paving" is a characteristic HRCT pattern (diffuse ground-glass densities with thickened intralobular & interlobular septa, producing polygonal shapes).

322 "Eggshell" pattern of hilar node calcification is seen in ?

Harrison's 18th Ed. 2124

- A. Asbestosis
- B. Berylliosis
- C. Silicosis
- D. Coal worker's pneumoconiosis (CWP)

Calcification of hilar nodes produces a characteristic "eggshell" pattern in simple silicosis.

323 Potential clinical complication of silicosis is ?

Harrison's 18th Ed. 2125

- A. Mycobacterium tuberculosis infection
- B. Rheumatoid arthritis
- C. Scleroderma
- D. All of the above

Silica is cytotoxic to alveolar macrophages. Lung infections (Mycobacterium tuberculosis, atypical mycobacteria & fungi) are therefore common. Autoimmune connective tissue disorders like rheumatoid arthritis or scleroderma also occur.

324 Caplan's syndrome is ?

Harrison's 18th Ed. 2125

- A. Seronegative Rheumatoid arthritis + Neutropenia
- B. Seropositive Rheumatoid arthritis + splenomegaly
- C. Seropositive Rheumatoid arthritis + progressive massive fibrosis (PMF)

- D. Seronegative Rheumatoid arthritis + bronchial asthma

Caplan's syndrome occurs in patients with silicosis includes seropositive rheumatoid arthritis with characteristic pneumoconiotic nodules leading to progressive massive fibrosis (PMF).

325 Histopathological lesion of which of the following environment-associated disease is similar to sarcoidosis ?

Harrison's 18th Ed. 2125

- A. Asbestosis
- B. Berylliosis
- C. Coal worker's pneumoconiosis (CWP)
- D. Silicosis

Beryllium is commonly associated with a chronic granulomatous inflammatory disease that is similar to sarcoidosis. Hilar adenopathy is less common though.

326 Which of the following confers increased risk of chronic beryllium disease (CBD) ?

Harrison's 18th Ed. 2125

- A. Glu69 polymorphism of HLA-DP chain
- B. Glu79 polymorphism of HLA-DP chain
- C. Glu89 polymorphism of HLA-DP chain
- D. Glu99 polymorphism of HLA-DP chain

Glu69 polymorphism of the HLA-DP chain confers increased risk of CBD.

327 "Monday chest tightness" is seen in ?

Harrison's 18th Ed. 2126

- A. Bagassosis
- B. Byssinosis
- C. Berylliosis
- D. Asbestosis

Cotton dust exposure (Byssinosis) is characterized clinically by chest tightness toward the end of first day of workweek ("Monday chest tightness").

328 "Monday chest tightness" responds best to ?

Harrison's 17th Ed. 1616

- A. Bronchodilators
- B. Antihistamines
- C. Oxygen therapy
- D. All of the above

329 Thermophilic actinomycetes can cause all except ?

Harrison's 18th Ed. 2126

- A. Bagassosis
- B. Farmer's lung
- C. Mushroom worker's lung
- D. Tobacco worker's lung

330 Which of the following is not a feature of acute farmer's lung ?

Harrison's 18th Ed. 2126

- A. Onset 4 - 8 h after exposure
- B. Fever with chills
- C. Cough and dyspnea
- D. Wheezing

Acute farmer's lung presents 4 - 8 hours after exposure with fever, chills, malaise, cough & dyspnea without wheezing.

331 Which of the following agent has been implicated in "Tight-building syndrome" ?

Harrison's 18th Ed. 2128

- A. Dust mites
- B. Perfumes
- C. Latex particles
- D. None of the above

Nonspecific responses occur in "tight-building syndrome" and no particular agent has been implicated in its causation.

332 Which of the following is false about "nuisance dusts" ?

Harrison's 16th Ed. 1524

- A. Do not affect architecture of terminal bronchioles/acini
- B. Clinical effects are reversible
- C. Pulmonary function tests are usually normal
- D. None of the above

333 Siderosis is due to ?

Harrison's 16th Ed. 1524

- A. Iron & iron oxides
- B. Tin oxide
- C. Barium sulfate
- D. Antimony salts

334 Baritosis is due to ?

Harrison's 16th Ed. 1524

- A. Iron & iron oxides
- B. Tin oxide
- C. Barium sulfate
- D. Antimony salts

335 Stannosis is due to ?

Harrison's 16th Ed. 1524

- A. Iron & iron oxides
- B. Tin oxide
- C. Barium sulfate
- D. Antimony salts

336 Hypereosinophilic syndrome is characterised by TEC ?

Harrison's 16th Ed. 1520

- A. > 250 / μ L
- B. > 500 / μ L
- C. > 1000 / μ L
- D. > 1500 / μ L

337 For diagnosis of hypereosinophilic syndrome, the duration of eosinophilia must be ?

Harrison's 16th Ed. 1520

- A. > 2 weeks
- B. > 2 months
- C. > 4 months
- D. > 6 months

338 All can cause chronic bronchitis except ?

Harrison's 18th Ed. 2127 Table 256-2

- A. Phosgene

- B. Hydrogen sulphide
- C. Ozone
- D. Ammonia

Chapter 257. Pneumonia

339 Pneumonia is an infection of ?

Harrison's 18th Ed. 2130

- A. Pulmonary parenchyma
- B. Terminal bronchiole
- C. Respiratory bronchiole
- D. All of the above

Pneumonia is an infection of the pulmonary parenchyma.

340 HCAP stands for ?

Harrison's 18th Ed. 2130

- A. Hospital-community acquired pneumonia
- B. Hospital-community associated pneumonia
- C. Health care - associated pneumonia
- D. Health care - acquired pneumonia

Pneumonia is categorized as either community-acquired pneumonia (CAP) or health care - associated pneumonia (HCAP). HCAP includes hospital-acquired pneumonia (HAP) & ventilator-associated pneumonia (VAP).

341 Which of the following is the most common route for bacterial pneumonia ?

Harrison's 18th Ed. 2130

- A. Aerosolization
- B. Contiguous extension
- C. Microaspiration of oropharyngeal secretions
- D. Hematogenous spread

Most common mechanism by which microorganisms gain access to lower respiratory tract is by aspiration from the oropharynx.

342 Which of the following is instrumental in clearing and killing pathogens at the the alveolar level ?

Harrison's 18th Ed. 2130

- A. Resident alveolar macrophages
- B. Surfactant protein A
- C. Surfactant protein D
- D. All of the above

Resident alveolar macrophages are assisted by local proteins (surfactant proteins A and D) in clearing and killing pathogens at the the alveolar level.

343 Which of the following triggers the clinical syndrome of pneumonia ?

Harrison's 18th Ed. 2130

- A. Host inflammatory response
- B. Proliferation of microorganisms
- C. Alveolar capillary leak
- D. All of the above

Alveolar macrophages initiate the inflammatory response. The host inflammatory response, rather than the proliferation of microorganisms, triggers the clinical syndrome of pneumonia.

344 Release of which of the following results in fever ?*Harrison's 18th Ed. 2130*

- A. Interleukin (IL) 1
- B. Interleukin (IL) 8
- C. Granulocyte colony-stimulating factor
- D. All of the above

Release of inflammatory mediators interleukin (IL) 1 & tumor necrosis factor (TNF) results in fever. Chemokines IL-8 & granulocyte colony-stimulating factor stimulate release of neutrophils & their attraction to lung.

345 Macrophage is the dominant cell type in alveolar space in which of the following pathological phase of pneumonia ?*Harrison's 18th Ed. 2131*

- A. Edema
- B. Red hepatization
- C. Gray hepatization
- D. Resolution

In the resolution phase, macrophage is the dominant cell type in alveolar space.

346 Neutrophil is the dominant cell type in alveolar space in which of the following pathological phase of pneumonia ?*Harrison's 18th Ed. 2131*

- A. Edema
- B. Red hepatization
- C. Gray hepatization
- D. Resolution

In the third phase i.e. gray hepatization, neutrophil is the predominant cell, fibrin deposition is abundant, and bacteria have disappeared.

347 Successful containment of infection & improvement in gas exchange occurs in which of the following pathological phase of pneumonia ?*Harrison's 18th Ed. 2131*

- A. Edema
- B. Red hepatization
- C. Gray hepatization
- D. Resolution

Phase of gray hepatization corresponds with successful containment of the infection and improvement in gas exchange.

348 Four pathological phases of pneumonia are best described for ?*Harrison's 18th Ed. 2131*

- A. Pneumococcal pneumonia
- B. Viral pneumonia
- C. Pneumocystis pneumonia
- D. All of the above

Four pathological phases of pneumonia are described best for lobar pneumococcal pneumonia and may not apply to pneumonias of all etiologies, especially viral or Pneumocystis pneumonia.

349 Bronchopneumonia pattern is most common in ?*Harrison's 18th Ed. 2131*

- A. Bacterial CAP
- B. Nosocomial pneumonia
- C. Viral pneumonia
- D. Pneumocystis pneumonia

Due to microaspiration mechanism, bronchopneumonia pattern is most common in nosocomial pneumonias. Lobar pattern is more common in bacterial CAP.

350 Which of the following is the most common cause of CAP in OPD, Non-ICU and ICU ?*Harrison's 18th Ed. 2131 Table 257-2*

- A. Streptococcus pneumoniae
- B. Haemophilus influenzae
- C. Mycoplasma pneumoniae
- D. H. influenzae

Streptococcus pneumoniae is most common of CAP in OPD, Non-ICU and ICU.

351 Which of the following complicates influenza infection ?*Harrison's 18th Ed. 2131*

- A. Streptococcus pneumoniae
- B. Haemophilus influenzae
- C. Staphylococcus aureus
- D. H. influenzae

S. aureus pneumonia is well known to complicate influenza infection.

352 Which of the following is not an independent risk factor for community-acquired pneumonia ?*Harrison's 18th Ed. 2132*

- A. Alcoholism
- B. Asthma
- C. Immunosuppression
- D. Age > 60 years

Risk factors for CAP include alcoholism, asthma, immunosuppression, institutionalization, and an age of >=70 years.

353 Which of the following is the strongest independent predictor of invasive pneumococcal disease in immunocompetent young adults ?*Harrison's 17th Ed. 1621 Harrison's 16th Ed. 1530*

- A. Alcoholism
- B. Cigarette smoking
- C. Chronic obstructive pulmonary disease
- D. Male gender

Risk factors for pneumococcal pneumonia include dementia, seizure disorders, heart failure, cerebrovascular disease, alcoholism, tobacco smoking, chronic obstructive pulmonary disease, and HIV infection. Cigarette smoking is the strongest independent predictor of invasive pneumococcal disease among immunocompetent young adults.

354 A recent hotel stay or ship cruise predisposes a person to pneumonia due to ?*Harrison's 18th Ed. 2132*

- A. Legionella
- B. Enterobacteriaceae
- C. CA-MRSA
- D. P. aeruginosa

Risk factors for Legionella infection include diabetes, hematologic malignancy, cancer, renal disease, HIV, smoking, male, and a recent hotel stay or ship cruise.

355 Pneumatocoles on chest radiography suggest infection with ?*Harrison's 18th Ed. 2132*

- A. Enterobacteriaceae
- B. P. aeruginosa

- C. *M. tuberculosis*
D. *S. aureus*

In CAP, pneumatoceles suggest infection with S. aureus.

356 To be adequate for culture, sputum sample should have ?

Harrison's 18th Ed. 2133

- A. >25 PMN & <10 squamous cells per low power field
B. >25 PMN and <20 squamous cells per low power field
C. >50 PMN and <10 squamous cells per low power field
D. >50 PMN and <20 squamous cells per low power field

To be adequate for culture, a sputum sample must have >25 neutrophils (PMN) and <10 squamous epithelial cells per low-power field.

357 Urinary antigen detection by ELISA is done for which of the following lung infections ?

Harrison's 18th Ed. 2133

- A. *Legionella pneumophila* serogroup 1
B. *C. burnetii*
C. *Histoplasma capsulatum*
D. *Neisseria meningitidis*

358 Urinary antigen detection by ELISA is done for which of the following lung infections ?

Harrison's 18th Ed. 2133

- A. *S. pneumoniae*
B. *Mycobacterium tuberculosis*
C. *Histoplasma capsulatum*
D. *Neisseria meningitidis*

Pneumococcal & Legionella pneumophila serogroup 1 antigens can be detected in urine.

359 In pneumonia, following etiologic agents can be diagnosed serologically except ?

Harrison's 16th Ed. 1533

- A. *Mycoplasma pneumoniae*
B. *Chlamydia pneumoniae*
C. *Chlamydia psittaci*
D. *Histoplasma capsulatum*

360 In pneumonia, following etiologic agents can be diagnosed serologically except ?

Harrison's 16th Ed. 1533

- A. *Legionella* spp.
B. *Coxiella burnetii*
C. Adenovirus
D. *Coccidioides immitis*

361 Number of variables included in the Pneumonia Severity Index (PSI) is ?

Harrison's 18th Ed. 2133

- A. 8
B. 15
C. 20
D. 26

To determine the PSI, points are given for 20 variables.

362 Number of variables included in the CURB-65 criteria is ?

Harrison's 18th Ed. 2133

- A. 3
B. 4
C. 5
D. 6

CURB-65 criteria include five variables - confusion (C), urea >7 mmol/L (U), respiratory rate 30/minute (R), blood pressure, systolic 90 mmHg or diastolic 60 mmHg (B) and age 65 years (65).

363 Patients should be admitted to the hospital when the CURB-65 score is more than ?

Harrison's 18th Ed. 2133

- A. 0
B. 1
C. 2
D. 3

With a CURB-65 score of 2, 30-day mortality rate is 9.2% & patients should be admitted in hospital.

364 Methicillin resistance in *S. aureus* is determined by ?

Harrison's 18th Ed. 2134

- A. *ermB* gene
B. *mecA* gene
C. *gyrA* gene
D. *parC* gene

*Methicillin resistance in *S. aureus* is determined by the *mecA* gene, which encodes for resistance to all β -lactam drugs.*

365 CA-MRSA has which type of SCCmec element ?

Harrison's 18th Ed. 2134

- A. Type I
B. Type II
C. Type III
D. Type IV

*Out of the five staphylococcal chromosomal cassette *mec* (SCCmec) types described, typical hospital-acquired strains have type II or III, whereas CA-MRSA has a type IV SCCmec element.*

366 Which of the following is a superantigen in CA-MRSA strains ?

Harrison's 18th Ed. 2134

- A. Enterotoxins B
B. Enterotoxins C
C. Panton-Valentine leukocidin
D. All of the above

CA-MRSA strains also carry genes for superantigens, such as enterotoxins B and C and Panton-Valentine leukocidin that can create cytolytic pores in polymorphonuclear neutrophils, monocytes, and macrophages.

367 Which of the following bacteria is typically resistant to cephalosporins ?

Harrison's 18th Ed. 2134

- A. *Escherichia coli*
B. *Enterobacter* spp.
C. CA-MRSA
D. All of the above

Enterobacter spp. are typically resistant to cephalosporins. Drugs of choice for these are usually fluoroquinolones or carbapenems.

368 If CA-MRSA pneumonia infection is suspected, which of the following should be added to initial empirical regimen ?

Harrison's 18th Ed. 2135

- A. Tobramycin
- B. Meropenem
- C. Linezolid
- D. Piperacillin/tazobactam

If CA-MRSA infection is suspected, either linezolid or vancomycin should be added to the initial empirical regimen.

369 In empirical treatment of community-acquired pneumonia, which of the following has significantly higher mortality rate ?

Harrison's 16th Ed. 1534

- A. Macrolide + second-generation cephalosporin
- B. Second- or third-generation cephalosporin alone
- C. Fluoroquinolone
- D. Aminoglycoside + any other antibiotic

Combination of an aminoglycoside & any other antibiotic has a significantly higher mortality rate.

370 Therapy of longer duration is recommended for all of the following pathogens causing community-acquired pneumonia except ?

Harrison's 16th Ed. 1535 Table 239-9

- A. Legionella spp.
- B. P. aeruginosa
- C. S. pneumoniae
- D. Enterobacteriaceae

Pneumonia due to Legionella spp., P. aeruginosa, or Enterobacteriaceae usually requires therapy of longer duration (often up to 21 days).

371 Which of the following is intrinsically resistant to many of the empirical antibiotic regimens ?

Harrison's 18th Ed. 2139

- A. Acinetobacter
- B. Stenotrophomonas maltophilia
- C. Burkholderia cepacia
- D. All of the above

Acinetobacter, Stenotrophomonas maltophilia, and Burkholderia cepacia are intrinsically resistant to many of the empirical antibiotic regimens

372 Drotrecogin alfa (activated) should be considered for CAP patients if ?

Harrison's 18th Ed. 2136

- A. Persistent septic shock
- B. APACHE II scores of ≥ 25
- C. Infection by S. pneumoniae
- D. All of the above

Immunomodulatory therapy with drotrecogin alfa (activated) should be considered for CAP patients with persistent septic shock & APACHE II scores of ≥ 25 , particularly if infection is by S. pneumoniae.

373 In community-acquired pneumonia, complicating pleural effusion should be drained for all the following reasons except ?

Harrison's 18th Ed. 2136

- A. If the fluid has a pH of < 7
- B. If the fluid has a glucose level of < 2.2 mmol/L
- C. If the fluid has a LDH content of > 500 units
- D. If the fluid has positive on Gram's staining or culture

A significant pleural effusion in pneumonia should be tapped if fluid has a pH of < 7 , glucose < 2.2 mmol/L and LDH > 1000 U/L or if bacteria are seen or cultured.

374 Lung abscess may occur in association with ?

Harrison's 18th Ed. 2136

- A. Aspiration
- B. CA-MRSA infection
- C. P. aeruginosa infection
- D. All of the above

Lung abscess may occur in association with aspiration or with infection caused by a single CAP pathogen, such CA-MRSA, P. aeruginosa, or S. pneumoniae.

375 In treated pneumonia, a follow-up radiograph is done after how many weeks ?

Harrison's 18th Ed. 2136

- A. One week
- B. 3 weeks
- C. 4 - 6 weeks
- D. 8 - 12 weeks

Chest radiographic abnormalities are slowest to resolve & may require 4 - 12 weeks to clear. A follow-up radiograph can be done ~4 - 6 weeks later.

376 Clinical Pulmonary Infection Score (CPIS) was developed for the diagnosis of ?

Harrison's 18th Ed. 2139

- A. CAP
- B. HAP
- C. HCAP
- D. VAP

Clinical Pulmonary Infection Score (CPIS) was developed for the diagnosis of VAP.

377 Which of the following is intrinsically resistant to many of the empirical antibiotic regimens ?

Harrison's 18th Ed. 2139

- A. Acinetobacter spp.
- B. Stenotrophomonas maltophilia
- C. Burkholderia cepacia
- D. All of the above

Acinetobacter spp., Stenotrophomonas maltophilia and Burkholderia cepacia are intrinsically resistant to many of the empirical antibiotic regimens employed.

378 The most sensitive component of the CPIS is improvement in ?

Harrison's 18th Ed. 2140

- A. Oxygenation
- B. Body temperature
- C. Leucocytosis
- D. Tracheal aspirate culture

The most sensitive component of the CPIS is improvement in oxygenation.

379 In VAP, clinical improvement, if it occurs, is usually evident within how many hours of initiation of antimicrobial treatment ?

Harrison's 18th Ed. 2140

- A. 6 - 12 hours
- B. 12 - 24 hours
- C. 24 - 48 hours

D. 48 - 72 hours

In VAP, clinical improvement, if it occurs, is usually evident within 48–72 h of the initiation of antimicrobial treatment.

380 Pneumonia caused by which pathogen signifies that patients immune system is so compromised that death is almost inevitable ?

Harrison's 18th Ed. 2140

- A. *P. aeruginosa*
- B. *S. maltophilia*
- C. *Acinetobacter* spp.
- D.

*Pneumonia caused by *S. maltophilia* is a marker for a patient whose immune system is so compromised that death is almost inevitable.*

381 Which of the following are active in opsonization of bacteria in lower respiratory tract ?

Harrison's 16th Ed. 1529

- A. Surfactant
- B. IgG
- C. Fibronectin
- D. All of the above

Surfactant is bactericidal to certain pathogens & along with IgG & fibronectin can opsonize bacteria.

382 Which of the following statements about alveolar macrophages is false ?

Harrison's 16th Ed. 1529

- A. Density is one per alveolus
- B. Play a role in both innate and acquired immunity
- C. Have a short life span
- D. Have ability to phagocytose multiple times

Alveolar macrophages are present at a density of one per alveolus. They play a role in innate & acquired immunity and have a long life span (20 to 80 days) and can phagocytose multiple times.

383 Which of the following does not cause pneumonia through aerosolization route ?

Harrison's 16th Ed. 1529

- A. *Mycobacterium tuberculosis*
- B. *Histoplasma capsulatum*
- C. *Escherichia coli*
- D. *Legionella*

*Aerosolization is the route by which *M. tuberculosis*, *Coccidioides immitis*, *Blastomyces dermatitidis*, *Histoplasma capsulatum*, *Legionella* spp., *Coxiella burnetii*, influenza viruses A and B reach the lungs. *Escherichia coli* commonly originates from urinary tract infections.*

384 Which of the following produces ciliostatic factor ?

Harrison's 16th Ed. 1529

- A. *Mycoplasma pneumoniae*
- B. *Chlamydia pneumoniae*
- C. Influenza virus
- D. *Neisseria meningitidis*

Chlamydia pneumoniae produces a ciliostatic factor to counteract host defenses..

385 Which of the following are resistant to microbicidal activity of phagocytes ?

Harrison's 16th Ed. 1529

- A. *Mycobacterium*

- B. *Nocardia*
- C. *Legionella* spp.
- D. All of the above

Mycobacterium, Nocardia & Legionella spp. are resistant to the microbicidal activity of phagocytes.

386 Virulence factor 'pneumolysin' interacts with any cell whose membrane contains ?

Harrison's 16th Ed. 1529

- A. Peptides
- B. Cholesterol
- C. Triglyceride
- D. Amino acids

All pneumococci produce pneumolysin that interacts with any cell whose membrane contains cholesterol. Pneumococci also produce neuraminidase, hyaluronidase, and IgA1 protease.

387 In patients with community-acquired pneumonia, which of the following is an independent risk factor for a fatal outcome ?

Harrison's 16th Ed. 1529

- A. Lymphotoxin- α +250 AA genotype
- B. TNF- α 308:LT- α +250 GC haplotype
- C. TNF- α 238 GA genotype
- D. DRB1*1501/DQB1*0602 haplotype

388 In patients with community-acquired pneumonia, which of the following is a risk factor for septic shock ?

Harrison's 16th Ed. 1529

- A. Lymphotoxin- α +250 AA genotype
- B. TNF- α 308:LT- α +250 GC haplotype
- C. TNF- α 238 GA genotype
- D. DRB1*1501/DQB1*0602 haplotype

389 In patients with community-acquired pneumonia, which of the following is protective against septic shock ?

Harrison's 16th Ed. 1529

- A. Lymphotoxin- α +250 AA genotype
- B. TNF- α 308:LT- α +250 GC haplotype
- C. TNF- α 238 GA genotype
- D. DRB1*1501/DQB1*0602 haplotype

In patients with CAP, the TNF- α 238 GA genotype is an independent risk factor for a fatal outcome, lymphotoxin- α (LT- α) +250 AA genotype is a risk factor for septic shock, and the TNF- α 308:LT- α +250 GC haplotype is protective against septic shock.

390 In the clinical entity designated ALPS, 'S' stands for ?

Harrison's 16th Ed. 1530

- A. Smoking
- B. Sepsis
- C. Sedantry
- D. Supine

Clinical entity designated ALPS (alcoholism, leukopenia, pneumococcal sepsis) is associated with a mortality rate of 80%.

391 'PORT risk score' is used to classify ?

Harrison's 16th Ed. 1532

- A. Community-acquired pneumonia
- B. Bronchiectasis
- C. Interstitial lung disease

D. Pulmonary thromboembolism

PORT stands for Pneumonia Patient Outcomes Research Team. PORT risk class stratifies mortality rate in Community-Acquired Pneumonia.

392 The single most useful clinical sign of severity of pneumonia in a person without underlying lung disease is ?

Harrison's 16th Ed. 1532

- A. Respiratory rate >30/minute
- B. Pulse rate > 100/minute
- C. Hypothermia
- D. Postural fall of SBP > 10 mm Hg

The single most useful clinical sign of the severity of pneumonia is a respiratory rate of >30/minute in a person without underlying lung disease.

393 Which of the following bacterial pneumonia has the highest mortality rate ?

Harrison's 16th Ed. 1532

- A. *P. aeruginosa*
- B. *Klebsiella* spp.
- C. *E. coli*
- D. *S. aureus*

Mortality rate is highest (>50%) for pneumonia due to *P. aeruginosa*, followed by *Klebsiella* spp., *E. coli*, *S. aureus*, and *Acinetobacter* spp. (30 to 35%).

394 Which capsular serotype pneumococcus is associated with a higher mortality rate ?

Harrison's 16th Ed. 1532

- A. 1
- B. 2
- C. 3
- D. 4

Capsular serotype 3 pneumococcus is associated with a much higher mortality rate than serotype 1.

395 In a case of pneumonia, pneumatoceles in chest radiograph suggests infection with ?

Harrison's 16th Ed. 1532

- A. *Mycobacterium tuberculosis*
- B. *S. aureus*
- C. *Escherichia coli*
- D. *Legionella*

396 Microorganisms isolated from sputum that should always be considered pathogens include ?

Harrison's 16th Ed. 1533

- A. *Mycobacterium tuberculosis*
- B. *Legionella* spp.
- C. *Blastomyces dermatitidis*
- D. All of the above

397 Microorganisms isolated from sputum that should always be considered pathogens include ?

Harrison's 16th Ed. 1533

- A. *Blastomyces dermatitidis*
- B. *Histoplasma capsulatum*
- C. *Coccidioides immitis*
- D. All of the above

Certain microorganisms, if isolated from sputum, should always be considered pathogens. These include *M. tuberculosis*, *Legionella* spp., *B. dermatitidis*, *H. capsulatum*, and *C. immitis*.

398 Aerobic pathogen most often implicated in causation of aspiration-associated lung abscesses is ?

Harrison's 16th Ed. 1537

- A. *Streptococcus milleri*
- B. *Bacteroides fragilis*
- C. *Prevotella oralis*
- D. *Fusobacterium nucleatum*

Most aspiration-associated lung abscesses are due to a combination of aerobic and anaerobic bacteria, with an average of six or seven bacterial species identified in an individual case. *Streptococcus milleri* is one of the principal aerobic pathogens.

399 Gastric acid aspiration leading to aspiration pneumonitis requires following characteristics of gastric aspirate ?

Harrison's 16th Ed. 1538

- A. pH < 2.5 & gastric aspirate volume of > 0.3 mL/kg
- B. pH < 5 & gastric aspirate volume of > 0.3 mL/kg
- C. pH < 2.5 & gastric aspirate volume of > 0.6 mL/kg
- D. pH < 5 & gastric aspirate volume of > 0.6 mL/kg

Gastric aspirate pH of <2.5 & volume >0.3 mL/kg (20 to 25 mL in adults) is required for the development of aspiration pneumonitis.

400 Which of the following is a respiratory fluoroquinolone ?

Harrison's 18th Ed. 2135 Table 257-4

- A. Moxifloxacin
- B. Gemifloxacin
- C. Levofloxacin
- D. All of the above

Respiratory fluoroquinolones include moxifloxacin, gemifloxacin and levofloxacin.

401 Hospital-acquired pneumonia (HAP) is defined as pneumonia occurring how many hours after hospital admission ?

Harrison's 16th Ed. 1538

- A. At least 12 hours
- B. At least 24 hours
- C. At least 36 hours
- D. At least 48 hours

HAP is defined as pneumonia occurring at least 48 hours after hospital admission and not incubating at the time of admission.

402 Cefoxitin, Cefotetan, and Cefmetazole belong to which generation of cephalosporins ?

Harrison's 16th Ed. 1538

- A. First
- B. Second
- C. Third
- D. None of the above

Cephameycins (cefoxitin, cefotetan, & cefmetazole) are structurally different from true cephalosporins & display enhanced stability in the presence of ESBLs. Some consider cephamycins to be subset of second-generation cephalosporins.

403 ESBL-producing isolates should be considered resistant to ?

Harrison's 17th Ed. 938

- A. All penicillins
- B. Cephalosporins

- C. Aztreonam
- D. All of the above

ESBL-producing isolates should be considered resistant to all penicillins, cephalosporins & aztreonam.

404 Which of the following organisms have been designated as “core pathogens” in the American Thoracic Society’s guidelines for treatment of nosocomial pneumonia ?

Harrison’s 16th Ed. 1538

- A. *S. pneumoniae*
- B. *H. influenzae*
- C. *S. aureus*
- D. All of the above

405 According to American Thoracic Society (ATS) guidelines for treatment of nosocomial pneumonia “core pathogens” include all except ?

Harrison’s 16th Ed. 1539

- A. *Staphylococcus aureus*
- B. *Pneumococcus*
- C. *Pseudomonas aeruginosa*
- D. *E. coli*

*“Core pathogens” in American Thoracic Society’s guidelines for the treatment of nosocomial pneumonia are *S. pneumoniae*, *H. influenzae*, *S. aureus*, and enteric gram-negative bacilli (*E. coli*, *Klebsiella* spp., *Proteus* spp., and *Serratia marcescens*).*

406 British Thoracic Society (BTS) criteria for severe community acquired pneumonia includes all parameters except ?

Harrison’s 16th Ed. 1532

- A. Pulse rate
- B. Blood pressure
- C. Respiratory rate
- D. Blood urea level

British Thoracic Society Rule for definition of severe community-acquired pneumonia includes confusion, urea, respiratory rate and blood pressure.

407 In a case of pneumonia, urine examination can help in the etiological diagnosis in ?

Harrison’s 16th Ed. 1533

- A. *Mycoplasma*
- B. *Chlamydia*
- C. *Coxiella*
- D. *L. pneumophila* serogroup 1

408 In a case of pneumonia, urine examination can help in the etiological diagnosis in ?

Harrison’s 16th Ed. 1533

- A. *Mycoplasma*
- B. *Chlamydia*
- C. *Coxiella*
- D. *S. pneumoniae*

Chapter 258. Bronchiectasis and Lung Abscess

409 Patterns of bronchiectasis were described by ?

Harrison’s 16th Ed. 1541

- A. RTH Laënnec
- B. Lynne Reid
- C. Jean Athanase Sicard
- D. PJ Cole

Different patterns of bronchiectasis were described by Reid in 1950.

410 Which of the following is false about bronchiectasis ?

Harrison’s 18th Ed. 2142

- A. Abnormal & permanent dilatation of bronchi
- B. Affects older individuals
- C. Affects women more than men
- D. None of the above

411 Which of the following forms of bronchiectasis is due to an underlying systemic or infectious disease process ?

Harrison’s 18th Ed. 2142

- A. Cylindrical or tubular bronchiectasis
- B. Varicose bronchiectasis
- C. Focal bronchiectasis
- D. Diffuse

Diffuse bronchiectasis is characterized by widespread bronchiectatic changes throughout the lung and often arises from an underlying systemic or infectious disease process.

412 Bronchiectasis more pronounced in upper lung fields is most common in ?

Harrison’s 18th Ed. 2142

- A. Cystic fibrosis (CF)
- B. Scleroderma
- C. Idiopathic pulmonary fibrosis
- D. Due to *Mycobacterium avium-intracellulare* complex (MAC)

More pronounced bronchoectatic involvement of the upper lung fields is most common in cystic fibrosis (CF), in postirradiation fibrosis, corresponding to the lung region radiated.

413 Bronchiectasis more pronounced in lower lung fields is most common in ?

Harrison’s 18th Ed. 2142

- A. Cystic fibrosis (CF)
- B. Scleroderma
- C. Idiopathic pulmonary fibrosis
- D. Due to *Mycobacterium avium-intracellulare* complex (MAC)

414 Bronchiectasis more pronounced in lower lung fields is most common in ?

Harrison’s 18th Ed. 2142

- A. Scleroderma
- B. Idiopathic pulmonary fibrosis
- C. Hypogammaglobulinemia
- D. All of the above

Bronchiectasis with predominant involvement of the lower lung fields is due to chronic recurrent aspiration (due to esophageal motility disorders like scleroderma), end-stage fibrotic lung disease (traction bronchiectasis from idiopathic pulmonary fibrosis), or recurrent immunodeficiency-associated infections (hypogammaglobulinemia).

415 Bronchiectasis more pronounced in mid lung fields is most common in ?

Harrison’s 18th Ed. 2142

- A. Cystic fibrosis (CF)

- B. Scleroderma
- C. Idiopathic pulmonary fibrosis
- D. Due to *Mycobacterium avium-intracellulare* complex (MAC)

*Bronchiectasis due to infection by nontuberculous mycobacteria (NTM), mostly *Mycobacterium avium-intracellulare* complex (MAC) preferentially affects midlung fields. Congenital causes of bronchiectasis with predominant midlung field involvement include the dyskinetic/immotile cilia syndrome.*

416 Bronchiectasis of relatively proximal airways suggests ?

Harrison's 18th Ed. 2142

- A. Infection with *M. avium* complex
- B. ABPA
- C. Tuberculosis
- D. Cystic fibrosis

*Bronchiectasis accompanying ABPA involves proximal airways & is associated with mucoid impaction. An immune-mediated reaction to *Aspergillus* damages the bronchial wall.*

417 Which of the following is a congenital cause of bronchiectasis ?

Harrison's 18th Ed. 2142

- A. McCune-Albright syndrome
- B. Laurence-Moon-Biedl syndrome
- C. Kallmann syndrome
- D. Mounier-Kuhn syndrome

418 Which of the following is a congenital cause of bronchiectasis ?

Harrison's 18th Ed. 2142

- A. Pallister-Hall syndrome
- B. Prader-Willi syndrome
- C. Laron syndrome
- D. Williams-Campbell syndrome

Congenital causes of central airway predominant bronchiectasis resulting from cartilage deficiency include tracheobronchomegaly (Mounier-Kuhn syndrome) and Williams-Campbell syndrome.

419 In bronchiectasis, which of the following components of the wall of airways is destroyed ?

Harrison's 18th Ed. 2143

- A. Cartilage
- B. Muscle
- C. Elastic tissue
- D. All of the above

Normal structural components of larger-airway wall - cartilage, smooth muscle & elastic tissue are destroyed and may be replaced by fibrous tissue due to significant small-airway wall inflammation.

420 Which of the following is an action of α_1 antitrypsin ?

Harrison's 18th Ed. 2143

- A. Antiprotease
- B. Neutralizes damaging effects of neutrophil elastase
- C. Enhances bacterial killing
- D. All of the above

421 Bronchiectasis may occur with which of the following ?

Harrison's 18th Ed. 2143, Harrison's 16th Ed. 1542

- A. Ulcerative colitis
- B. Rheumatoid arthritis

- C. Sjogren's syndrome
- D. All of the above

Bronchiectasis occurs rarely in ulcerative colitis, rheumatoid arthritis & Sjogren's syndrome. Bronchiectasis due to noninfectious causes may occur in immune-mediated reactions that damage the bronchial wall (Sjögren's syndrome & rheumatoid arthritis).

422 Which of the following is false about bronchiectasis ?

Harrison's 17th Ed. 1629

- A. Parenchyma supplied by affected airways is abnormal
- B. Vascularity of bronchial wall is increased
- C. Broncho-pulmonary arterial anastomoses
- D. None of the above

423 In which pattern of bronchiectasis, bronchi end in blind sacs without recognizable distal bronchial structures ?

Harrison's 17th Ed. 1629

- A. Cylindrical or tubular
- B. Varicose
- C. Saccular
- D. All of the above

In saccular (cystic) bronchiectasis, bronchi end in blind sacs without recognizable bronchial structures distal to the sacs.

424 Which of the following is the most severe form of bronchiectasis ?

N Engl J Med 2002;346:1383

- A. Cylindrical or tubular
- B. Varicose bronchiectasis
- C. Saccular or cystic
- D. None of the above

425 Traction bronchiectasis as seen in HRCT is a feature of ?

N Engl J Med 2002;346:1383

- A. Asthma
- B. Chronic bronchitis
- C. Pulmonary fibrosis
- D. Allergic bronchopulmonary aspergillosis

426 Which of the following is the least common cause of bronchiectasis ?

Harrison's 17th Ed. 1629

- A. Adenovirus
- B. *Staphylococcus aureus*
- C. Tuberculosis
- D. *Mycoplasma*

*Adenovirus, influenza virus, *Staph. aureus*, *Klebsiella*, anaerobes, *Bordetella pertussis*, *M. tuberculosis* are important causes of bronchiectasis.*

427 Which of the following is not a feature of Kartagener's syndrome ?

Harrison's 17th Ed. 1629

- A. Situs inversus
- B. Colonic diverticula
- C. Bronchiectasis
- D. Sinusitis

Kartagener's syndrome includes situs inversus, bronchiectasis and sinusitis.

428 Which of the following is related to bronchiectasis ?

Harrison's 18th Ed. 2143

- A. Tram tracks
- B. Signet-ring sign
- C. "Tree-in-bud" pattern
- D. All of the above

In chest radiographs, presence of "tram tracks" indicate dilated airways and is consistent with bronchiectasis. Chest CT findings include airway dilation that is detected as parallel "tram tracks" or as "signet-ring sign" i.e. a cross-sectional area of the airway with a diameter at least 1.5 times that of the adjacent vessel, lack of bronchial tapering (including the presence of tubular structures within 1 cm from the pleural surface), bronchial wall thickening in dilated airways, inspissated secretions (e.g., the "tree-in-bud" pattern), or cysts emanating from the bronchial wall (especially pronounced in cystic bronchiectasis).

429 "Tram tracks" and "ring shadows" are chest radiological signs seen in ?

Harrison's 17th Ed. 1630

- A. Bronchopneumonia
- B. Bronchiectasis
- C. Bronchogenic carcinoma
- D. Aspergillosis

Dilated airways with thickened walls due to peribronchial inflammation are often crowded together in parallel. When seen longitudinally, they appear as "tram tracks", when seen in cross-section, they produce "ring shadows".

430 Nodular bronchiectasis is suggestive of ?

Harrison's 16th Ed. 1542

- A. Infection with Mycobacterium avium complex
- B. ABPA
- C. Cystic fibrosis
- D. P. aeruginosa infection

Presence of multiple small pulmonary nodules (nodular bronchiectasis) suggests infection with M. avium complex.

431 FEV₁ declines by how much per year in healthy individuals ?

Harrison's 18th Ed. 2144

- A. 10 - 20 mL
- B. 20 - 30 mL
- C. 30 - 40 mL
- D. 40 - 50 mL

Forced expiratory volume in 1 second (FEV₁) declines by 20 - 30 mL per year in healthy subjects.

432 Which of the following is not a feature of 'Yellow nail syndrome' ?

Harrison's 17th Ed. 1629

- A. Lymphedema
- B. Pleural effusion
- C. Mediastinal lymphadenopathy
- D. Yellow discoloration of nails

Yellow nail syndrome is due to hypoplastic lymphatics. The triad of lymphedema, pleural effusion and yellow discoloration of nails is accompanied by bronchiectasis in ~40% of patients.

433 Which lobe of lung is involved in "Dry" bronchiectasis ?

Harrison's 17th Ed. 1630

- A. Upper lobe
- B. Middle lobe
- C. Lower lobe

- D. Any of the above

Bronchiectasis with upper lobe involvement may be suggestive of either tuberculosis or ABPA.

434 Multiple small pulmonary abscesses in contiguous areas of lung is called ?

Harrison's 18th Ed. 2144

- A. Lung chancre
- B. Lung carbuncle
- C. Lung gangrene
- D. Lung pemphigus

Lung abscess refers to microbial infection of lung resulting in necrosis of pulmonary parenchyma. Necrotizing pneumonia or lung gangrene refers to multiple small pulmonary abscesses in contiguous areas of the lung, usually resulting from a more virulent infection.

435 Most common cause of lung abscess is ?

Harrison's 17th Ed. 1631

- A. Aspiration
- B. Periodontal disease
- C. Alcoholism
- D. Immunoglobulin deficiency

Aspiration is the most common cause of lung abscess.

436 Most common causative organisms for lung abscess is ?

Harrison's 18th Ed. 2145

- A. Anaerobic bacteria
- B. S. aureus
- C. Klebsiella pneumoniae
- D. M. tuberculosis

Anaerobic bacteria are the most common causative organisms for lung abscess.

437 Of the following, which is the most common pulmonary site of lung abscess ?

Harrison's 17th Ed. 1631

- A. Anterior segments of upper lobes
- B. Posterior segments of lower lobes
- C. Right middle lobe
- D. None of the above

Dependent areas of lung, particularly upper lobes & posterior segments of lower lobes are the most common pulmonary site of lung abscess.

438 Acute lung abscess in a healthy young patient, along with influenza, is likely to be due to ?

Harrison's 18th Ed. 2145, Table 258-2

- A. Klebsiella pneumoniae
- B. Staphylococcus aureus
- C. M. tuberculosis
- D. All of the above

Acute lung abscess in a healthy young patient, especially in conjunction with influenza, is likely to be due to Staphylococcus aureus. Other bacteria include S. milleri, K. pneumoniae, Group A Streptococcus, Gemella, Legionella, and Actinomyces spp. Parasites include Entamoeba histolytica, Paragonimus westermani, Strongyloides stercoralis.

439 Which of the following agent is found almost exclusively in patients with defective cell-mediated immunity ?

Harrison's 18th Ed. 2145, Table 258-2

- A. Nocardia asteroides

- B. Burkholderia pseudomallei
- C. Paragonimus westermani
- D. S. milleri

Agents that are found almost exclusively in patients with defective cell-mediated immunity are *Nocardia asteroides* and *Rhodococcus equi*. Other agents include *M. tuberculosis*, *Legionella* spp., *P. aeruginosa*, *Enterobacteriaceae* (*Klebsiella pneumoniae*), *Aspergillus* spp., *Cryptococcus* spp.

440 Lemierre's disease best relates to ?

Harrison's 18th Ed. 2145, Table 258-2

- A. Strongyloides stercoralis
- B. Blastomyces
- C. Fusobacterium necrophorum
- D. Gemella

441 Which of the following clinical features of nonspecific lung abscess is uncommon ?

Harrison's 18th Ed. 2145

- A. Fatigue
- B. Cough
- C. Sputum production
- D. Fever with chills

Chills are uncommon.

442 Foul odor of sputum is due to the organisms' production of ?

Harrison's 18th Ed. 2145

- A. Short-chain fatty acids
- B. Medium-chain fatty acids
- C. Long-chain fatty acids
- D. All of the above

Foul odor of sputum is due to the organisms' production of short-chain fatty acids, such as butyric or succinic acid.

443 Which of the following is uncommon in lung abscess ?

Harrison's 18th Ed. 2145

- A. Fever with chills
- B. Lymphadenopathy
- C. Anaerobic bacteria in expectorated sputum cultures
- D. All of the above

Lymphadenopathy is not associated with bacterial lung abscess and suggests an alternative diagnosis. Anaerobic bacteria, the most common causes of primary lung abscess, are not detected in expectorated sputum cultures.

444 Which of the following in lung abscess indicates anaerobic infection ?

Harrison's 18th Ed. 2145

- A. Putrid breath
- B. Sputum
- C. Empyema fluid
- D. All of the above

In lung abscess, putrid breath, sputum, or empyema fluid indicates anaerobic infection.

445 Which of the following drugs is now standard therapy for lung abscess ?

Harrison's 18th Ed. 2146

- A. Penicillin
- B. Clindamycin

- C. Metronidazole
- D. TMP-SMZ

Penicillin "was" the mainstay of empiric antibiotic therapy for lung abscess. Due to frequent β -lactamase producing organisms, clindamycin is now standard therapy.

446 Which of the following should not be used for pulmonary infections ?

Harrison's 18th Ed. 2146

- A. Linezolid
- B. Daptomycin
- C. Aerosolized colistin
- D. Aminoglycosides

Daptomycin should not be used for pulmonary infections.

Chapter 259. Cystic Fibrosis

447 The median survival for patients with CF is about ?

Harrison's 18th Ed. 2147

- A. 27 years
- B. 37 years
- C. 47 years
- D. 57 years

Due to improvements in therapy, the median survival is >37.4 years for patients with CF.

448 CF is characterized by ?

Harrison's 18th Ed. 2147

- A. Bronchiectasis
- B. Exocrine pancreatic insufficiency
- C. Intestinal dysfunction
- D. All of the above

CF is characterized by chronic bacterial infection of airways that leads to bronchiectasis and bronchiolitis, exocrine pancreatic insufficiency and intestinal dysfunction, abnormal sweat gland function, and urogenital dysfunction.

449 Cystic fibrosis (CF) is characterized by all except ?

Harrison's 18th Ed. 2147

- A. Polygenic disorder
- B. Autosomal recessive
- C. Bronchiectasis
- D. Exocrine pancreatic insufficiency

Cystic fibrosis (CF) is a monogenic autosomal recessive disorder.

450 CFTR stands for ?

Harrison's 18th Ed. 2147

- A. CF transmembrane resistance regulator
- B. CF transmembrane conductance regulator
- C. CF transport regulator
- D. CF transcription regulator

CFTR stands for CF transmembrane conductance regulator.

451 CFTR gene is located on chromosome ?

Harrison's 18th Ed. 2147

- A. 4
- B. 7

- C. 12
D. 13

CF is due to mutations in the gene located on the long arm of chromosome 7 that encodes CF transmembrane conductance regulator (CFTR) protein.

452 Which class of CF is least severe ?

Harrison's 18th Ed. 2147

- A. I
B. II
C. III
D. IV

Mutations in CFTR gene fall into five major classes. Classes I - III CFTR gene mutations are "severe" with pancreatic insufficiency and high sweat NaCl values. Class IV mutations can be "mild" associated with pancreatic sufficiency & intermediate/normal sweat NaCl values.

453 Which of the following is abnormal in Class IV CFTR gene mutation ?

Harrison's 18th Ed. 2147, Figure 259-1

- A. Defective protein synthesis
B. Defective processing
C. Defective regulation
D. Defective conduction

Class I - Defective protein synthesis, Class II - Defective processing, Class III - Defective regulation, Class IV - Defective conduction, Class V - Reduced functioning CFTR protein.

454 The most common mutation in CF is termed as ?

Harrison's 17th Ed. 1632, N Engl J Med 2005;352:1992-2001

- A. ΔF_{508}
B. N1303K
C. G85E
D. G91R

Most common mutation in CF is termed ΔF_{508} . CFTR with ΔF_{508} mutation lacks a phenylalanine (F) residue at position 508. Other clinically important mutations - N1303K, G85E, and G91R lead to misfolded CFTR protein that is prematurely degraded.

455 CF patients homozygous for ΔF_{508} have normal sweat electrolytes in the presence of which second mutation ?

N Engl J Med 1997;336:487

- A. R553Q
B. R554Q
C. R555Q
D. R556Q

Patients homozygous for ΔF_{508} mutation have normal sweat electrolyte concentrations if a second mutation - R553Q is also present.

456 The CFTR protein contains how many amino acids ?

Harrison's 18th Ed. 2147

- A. 1280
B. 1380
C. 1480
D. 1580

CFTR protein is a single polypeptide chain with 1480 amino acids. It functions as a cyclic AMP - regulated Cl^- channel and as a regulator of other ion channels.

457 Fully processed form of CFTR is found in ?

Harrison's 18th Ed. 2147

- A. Plasma membrane

- B. Nuclear membrane
C. Cytoplasm
D. Rough endoplasmic reticulum

Fully processed CFTR is found in the plasma membrane in normal epithelia.

458 Cellular function ascribed to CFTR is ?

N Engl J Med 2005;352:1992-2001

- A. Conducts chloride across cell membrane
B. Down-regulates transepithelial sodium transport
C. Regulates Ca^{++} -activated chloride & K^+ channels
D. All of the above

CFTR conducts chloride across the cell membrane & is regulated by protein kinase A (PKA) in a cAMP-dependent fashion. Other cellular functions of CFTR are down-regulation of transepithelial sodium transport, regulation of calcium-activated chloride & potassium channels.

459 Diagnostic biophysical hallmark of CF airway epithelia is ?

Harrison's 18th Ed. 2148

- A. Lowered transepithelial electric potential difference
B. Raised transepithelial electric potential difference
C. Plasma membrane fenestration
D. Plasma membrane rigidity

Diagnostic biophysical hallmark of CF airway epithelia is raised transepithelial electric potential difference which reflects both the rate of active ion transport and epithelial resistance to ion flow.

460 Cystic fibrosis (CF) is characterized by all except ?

Harrison's 18th Ed. 2148

- A. Increased airway Na^+ absorption
B. Increased airway Cl^- secretion
C. Reduced salt & water content of mucus
D. Decreased volume of periciliary liquid

Capacity to initiate cyclic AMP mediated Cl^- secretion is diminished in CF airway epithelia due to absence/dysfunction of CFTR Cl^- channel. Accelerated Na^+ absorption in CF reflects absence of CFTR inhibitory effects on Na^+ channels.

461 In a normal cell, CFTR is synthesized in ?

Harrison's 16th Ed. 1544 Figure 241-1

- A. Golgi apparatus
B. Rough endoplasmic reticulum
C. Mitochondria
D. Nucleus

CFTR is synthesized in rough endoplasmic reticulum (RER), glycosylated in Golgi apparatus & functions as a Cl^- channel & regulator of other ion channels when located in plasma membrane.

462 Which of the following is best related to airway surfaces in CF ?

Harrison's 18th Ed. 2148

- A. Edematous
B. Atrophic
C. Hypertrophic
D. Dehydrated

Due to faulty regulation of Na^+ absorption and inability to secrete Cl^- via CFTR reduce the volume of liquid on airway surfaces and appear "dehydrated".

463 Which of the following is mostly infected in CF ?

Harrison's 18th Ed. 2148

- A. Mucus layer
B. Epithelia

- C. Airway wall
- D. All of the above

Infection in CF airways involves mucus layer rather than epithelial or airway wall.

464 Which of the following is false about mucus layer in CF airways ?

Harrison's 18th Ed. 2148

- A. Mucus stasis
- B. Mucus hypoxemia
- C. Mucus dehydration
- D. All of the above

O₂ tension is very low in CF mucus (mucus hypoxemia). Mucus stasis is due to dehydration of mucus and periciliary liquid layers. It produces adhesion of mucus to airway surface causing failure to clear mucus from airways by ciliary and cough-dependent mechanisms.

465 CF airways are predisposed to chronic infection by ?

Harrison's 18th Ed. 2148

- A. Staphylococcus aureus
- B. Pseudomonas aeruginosa
- C. Strict anaerobes
- D. All of the above

466 CF patients fail to secrete which of the following in pancreatic duct ?

Harrison's 18th Ed. 2148

- A. Na⁺
- B. HCO₃⁻
- C. Water
- D. All of the above

In CF, failure to secrete Na⁺, HCO₃⁻ and water leads to retention of enzymes in pancreas & destruction of virtually all pancreatic tissue.

467 Cholelithiasis occurs with increased frequency in ?

Harrison's 17th Ed. 1633

- A. Cystic fibrosis (CF)
- B. Crohn's disease (CD)
- C. Wilson Disease
- D. All of the above

In addition to the above three illnesses, cholelithiasis occurs with increased frequency in polyglandular autoimmune syndrome Type I.

468 Which of the following can occur in CF ?

Harrison's 18th Ed. 2149

- A. Thickened biliary secretions
- B. Focal biliary cirrhosis
- C. Bile-duct proliferation
- D. All of the above

In CF, defective hepatic ductal salt (Cl⁻) & water secretion causes thickened biliary secretions, focal biliary cirrhosis, and bile-duct proliferation in ~ 25 - 30% of patients. Chronic cholecystitis and cholelithiasis also occur.

469 In CF, sweat emerging on the skin surface contains ?

N Engl J Med 2005;352:1992-2001

- A. High level of salt
- B. Low level of salt
- C. Normal level of salt

- D. Any of the above

In CF, sweat emerging on the skin surface contains a high level of salt.

470 Elevated electrolyte levels in sweat can be due to ?

N Engl J Med 1997;336:487

- A. Cystic fibrosis
- B. Fucosidosis
- C. Glycogen storage disease type 1
- D. All of the above

471 Elevated electrolyte levels in sweat can be due to ?

N Engl J Med 1997;336:487

- A. Mucopolysaccharidosis
- B. Hypothyroidism
- C. Vasopressin-resistant diabetes insipidus
- D. All of the above

472 Elevated electrolyte levels in sweat can be due to ?

N Engl J Med 1997;336:487

- A. Adrenal insufficiency
- B. Familial cholestasis
- C. Familial hypoparathyroidism
- D. All of the above

473 Recovery of which bacteria in bronchoalveolar lavage fluid supports the diagnosis of CF ?

N Engl J Med 1997;336:487

- A. Klebsiella pneumoniae
- B. Proteus mirabilis
- C. Escherichia coli
- D. Pseudomonas aeruginosa

Recovery of Pseudomonas aeruginosa in BAL fluid supports the diagnosis of CF.

474 In lower respiratory tract, the first symptom of CF is ?

Harrison's 18th Ed. 2149

- A. Cough
- B. Dyspnoea
- C. Pain chest
- D. Hemoptysis

In the lower respiratory tract, the first symptom of CF is cough.

475 Which of the following is often the first organism recovered from lung secretions in newly diagnosed CF patients ?

Harrison's 18th Ed. 2149

- A. P. aeruginosa
- B. Haemophilus influenzae
- C. Aspergillus fumigatus
- D. Klebsiella

Haemophilus influenzae and S. aureus are often the first organisms recovered from lung secretions in newly diagnosed CF patients.

476 Infection with which of the following is rare in CF ?

Harrison's 18th Ed. 2149

- A. Haemophilus influenzae
- B. Mycobacterium tuberculosis

- C. *P. aeruginosa*
- D. *Aspergillus fumigatus*

Mycobacterium tuberculosis is rare in patients with CF.

477 First lung-function abnormalities seen in CF children is ?

Harrison's 18th Ed. 2149

- A. Decreased forced vital capacity (FVC)
- B. Decreased FEV₁
- C. Decreased FEV₂₅₋₅₀
- D. Increased ratios of RV / TLC

First lung-function abnormality seen in CF children is increased ratios of residual volume to total lung capacity reflecting small-airways disease.

478 Earliest chest x-ray change in CF lungs is that of ?

Harrison's 18th Ed. 2149

- A. Hyperinflation
- B. Bronchial cuffing
- C. Bronchiectasis
- D. Pleural effusion

Earliest chest x-ray change in CF lungs is hyperinflation, reflecting small-airways obstruction.

479 Which part of the lung displays earliest & most severe changes in CF ?

Harrison's 18th Ed. 2149

- A. Right upper lobe
- B. Left upper lobe
- C. Right lower lobe
- D. Left lower lobe

Right upper lobe displays the earliest and most severe changes in CxR in CF.

480 Which of the following can occur in CF ?

Harrison's 18th Ed. 2149

- A. Pneumothorax
- B. Cor pulmonale
- C. Clubbing of digits
- D. All of the above

Pneumothorax occurs in >10% of CF patients. Hemoptysis is common. Clubbing of digits, respiratory failure and cor pulmonale point to advanced CF.

481 Distal intestinal obstruction syndrome (DIOS) consists of all except ?

Harrison's 18th Ed. 2149

- A. Left lower quadrant pain
- B. Loss of appetite
- C. Emesis
- D. Palpable mass

In children & young adults, meconium ileus equivalent or distal intestinal obstruction syndrome (DIOS) occurs consisting of right lower quadrant pain, loss of appetite, emesis & often a palpable mass.

482 Which of the following does not occur with increased frequency in CF ?

Harrison's 18th Ed. 2149

- A. Diabetes mellitus
- B. Appendicitis
- C. Cholelithiasis

- D. Malabsorption

DIOS can be confused with appendicitis, whose frequency is not increased in CF. Gastrointestinal malignancy is increased in incidence in CF. CF patients have an increased incidence of osteoarthritis, renal stones, and osteoporosis, particularly following transplant.

483 Which of the following can also cause pulmonary disease and azoospermia ?

N Engl J Med 1997;336:487

- A. Chédiak-Higashi syndrome
- B. Young's syndrome
- C. Felty's syndrome
- D. Job's Syndrome

Young's syndrome can cause pulmonary disease and azoospermia. > 95% of male patients with CF are azoospermic, reflecting obliteration of the vas deferens due to defective liquid secretion.

484 All of the following are useful tests for CF except ?

Harrison's 18th Ed. 2149

- A. Sweat chloride concentration
- B. Semen Analysis
- C. Serum lipids
- D. Nasal Potential-Difference Measurements

A combination of clinical criteria & abnormal CFTR function (sweat tests, nasal PD measurements, and CFTR mutation analysis) are required for diagnosis of CF.

485 What value of sweat Cl⁻ concentration is typical in CF adults ?

Harrison's 18th Ed. 2149

- A. > 40 meq/L
- B. > 50 meq/L
- C. > 60 meq/L
- D. > 70 meq/L

Typically in adults a sweat Cl⁻ concentration of >70 meq/L is pathognomonic for CF.

486 Normal mean nasal potential-difference is ?

N Engl J Med 1997;336:487

- A. -4.7 mV
- B. -24.7 mV
- C. -44.7 mV
- D. -64.7 mV

Normal mean nasal potential-difference is -24.7 mV. In CF, nasal transepithelial PD is raised

487 In CF, information of nasal potential-difference measurements can be augmented by the use of ?

N Engl J Med 1997;336:487

- A. Amiloride
- B. Chloride-free solution
- C. Isoproterenol
- D. All of the above

Nasal potential-difference measurements (including responses to amiloride, chloride-free solution, and isoproterenol) may demonstrate abnormal CFTR function more reliably than the sweat test.

488 What is the strength of hypertonic saline that is recommended for inhalation in CF ?

Harrison's 18th Ed. 2150

- A. 2 %
- B. 3 %
- C. 5 %

D. 7 %

Inhaled hypertonic saline (7%) has demonstrated efficacy in CF patients by restoring mucus clearance and pulmonary function.

489 In CF patients who have undergone lung transplantation, death principally results from ?

Harrison's 18th Ed. 2150

- A. Massive hemoptysis
- B. Secondary infection
- C. Obliterative bronchiolitis
- D. HIV complications

Only effective treatment for respiratory failure in CF is lung transplantation. 2-year survival for lung transplantation exceeds 60%. Transplant-patient deaths result principally from obliterative bronchiolitis.

Chapter 260. Chronic Obstructive Pulmonary Disease

490 COPD includes ?

Harrison's 18th Ed. 2151

- A. Emphysema
- B. Chronic bronchitis
- C. Small airways disease
- D. All of the above

COPD includes emphysema, chronic bronchitis and small airways disease all characterized by airflow limitation that is not fully reversible.

491 Asthma, chronic bronchitis and emphysema are variations of the same basic disease is hypothesised by ?

Harrison's 18th Ed. 2152

- A. American hypothesis
- B. British hypothesis
- C. Canadian hypothesis
- D. Dutch hypothesis

Dutch hypothesis suggests that asthma, chronic bronchitis & emphysema are variations of the same basic disease which is modulated by environmental & genetic factors to produce these pathologically distinct entities. British hypothesis states that asthma & COPD are fundamentally different diseases.

492 Obstructive lung disease is diagnosed if ?

Harrison's 16th Ed. 1551

- A. $FEV_1 / FVC < 0.7$
- B. $FEV_1 / FVC > 0.7$
- C. $FVC / FEV_1 < 0.7$
- D. $FVC / FEV_1 > 0.7$

COPD is characterized by an FEV1 value that is <80 % of the predicted normal value and an FEV1/FVC ratio of <0.70.

493 Which allele is associated with normal α_1 antitrypsin levels ?

Harrison's 18th Ed. 2152

- A. S
- B. M
- C. Z
- D. Null

Protease inhibitor (PI or SERPINA1) locus encodes α_1 AT. M allele is associated with normal α_1 AT levels. S allele is associated with slightly reduced α_1 AT levels.

494 Which allele is associated with markedly reduced α_1 antitrypsin levels ?

Harrison's 18th Ed. 2152

- A. S
- B. M
- C. Z
- D. Null

Z allele is associated with markedly reduced α_1 AT levels. Null alleles lead to absence of any α_1 AT. Individuals with two Z alleles or one Z and one null allele are referred to as PF , which is the most common form of severe α_1 AT deficiency.

495 α_1 antitrypsin is mainly produced in ?

Lancet 2005;365:2225-36

- A. Lung
- B. Liver
- C. Kidney
- D. Spleen

α_1 -antitrypsin deficiency is a genetic disorder, clinically characterised by liver disease & early-onset emphysema. α_1 AT is mainly produced in liver. Its main function is to protect lung against proteolytic damage from neutrophil elastase.

496 α_1 antitrypsin is the prototypic member of which superfamily of proteins ?

Lancet 2005;365:2225-36

- A. Glutamine protease inhibitor
- B. Methionine protease inhibitor
- C. Threonine protease inhibitor
- D. Serine protease inhibitor

497 Mutation that causes severe α_1 -antitrypsin deficiency arises in which gene ?

Harrison's 18th Ed. 2152, Lancet 2005;365:2225-36

- A. SERPINA 1
- B. SERPINA 2
- C. SERPINA 3
- D. SERPINA 4

Most frequent mutation that causes severe α_1 -AT deficiency arises in SERPINA1 gene & gives rise to Z allele. This mutation reduces concentrations in serum of α_1 AT by retaining polymerised molecules within hepatocytes.

498 Risk for emphysema increases when level of serum α_1 -AT is ?

Lancet 2005;365:2225-36

- A. < 11 μ mol/L
- B. < 21 μ mol/L
- C. < 31 μ mol/L
- D. < 41 μ mol/L

An amount of α_1 -AT below the serum protective threshold of 11 μ mol/L increases risk for emphysema.

499 SERPINA1 gene was formerly known as ?

Harrison's 18th Ed. 2152, Lancet 2005;365:2225-36

- A. PR
- B. PI
- C. PX
- D. PZ

SERPINA1 gene was formerly known as protease inhibitor (PI).

500 α_1 antitrypsin deficiency is inherited as ?*Lancet 2005;365:2225-36*

- A Autosomal co-dominant
- B Autosomal recessive
- C X linked
- D None of the above

α_1 -antitrypsin deficiency is inherited as an autosomal co-dominant disorder, for which more than 100 alleles have been identified.

501 SERPINA1 gene is located on ?*Lancet 2005;365:2225-36*

- A Long arm of chromosome 12
- B Long arm of chromosome 13
- C Long arm of chromosome 14
- D Long arm of chromosome 15

SERPINA1 gene is located on long arm of chromosome 14. It spans 12.2 kb & is organised into four coding (2, 3, 4, 5) & three non-coding (1a, 1b, 1c) exons.

502 Normal α_1 -antitrypsin concentrations in serum is ?*Lancet 2005;365:2225-36*

- A 5 - 13 mol/L
- B 13 - 20 mol/L
- C 20 - 53 mol/L
- D 65 - 90 mol/L

503 Normal α_1 -antitrypsin concentrations in serum is ?*Lancet 2005;365:2225-36 Table 2*

- A 15 - 50 mg/dL
- B 50 - 150 mg/dL
- C 150 - 350 mg/dL
- D 350 - 550 mg/dL

Normal alleles are typified by α_1 -antitrypsin concentrations in serum of 20 - 53 μ mol/L. Typically, deficient alleles lead to α_1 AT levels <20 μ mol/L.

504 Dysfunctional variants leading to abnormal function of α_1 antitrypsin can cause ?*Lancet 2005;365:2225-36*

- A Emphysema
- B Cirrhosis liver
- C Bleeding diathesis
- D All of the above

505 Dysfunctional variants leading to abnormal function of α_1 antitrypsin can cause ?*Lancet 2005;365:2225-36*

- A c-ANCA-positive vasculitis
- B Cirrhosis liver
- C Bleeding diathesis
- D All of the above

Dysfunctional variants lead to abnormal function of α_1 antitrypsin with reduced binding to neutrophil elastase (as in the F variant) or, as with Pittsburgh, structural abnormality that causes the protein to serve as a thrombin inhibitor rather than as an antielastolytic protein, causing a bleeding diathesis.

506 Testing for α_1 antitrypsin concentration in serum is done by ?*Harrison's 18th Ed. 2152, Lancet 2005;365:2225-36*

- A Nephelometry

- B Rocket immunoelectrophoresis
- C Radial immunodiffusion
- D All of the above

Testing for α_1 -AT deficiency in serum is done by nephelometry, rocket immunoelectrophoresis or radial immunodiffusion. Clinical laboratory test used most frequently to screen for α_1 -AT deficiency is measurement of the immunologic level of α_1 -AT in serum

507 α_1 antitrypsin plays a major role in inactivating ?*Lancet 2005;365:2225-36*

- A Macrophage elastase
- B Neutrophil elastase
- C Lymphocyte elastase
- D Eosinophil elastase

α_1 AT is the prototypic member of serine protease inhibitor (serpin) superfamily of proteins, which have a major role in inactivating neutrophil elastase to maintain protease-antiprotease balance.

508 α_1 antitrypsin deficiency, conformational instability of which structure of serpins leads to mutations and polymerisation ?*Lancet 2005;365:2225-36*

- A α -sheet
- B β -sheet
- C γ -sheet
- D δ -sheet

Conformational instability of the β -sheet structure of the serpins underlies their susceptibility to mutations and polymerisation.

509 α_1 antitrypsin deficiency can predispose to which of the following liver disorders ?*Lancet 2005;365:2225-36*

- A Chronic hepatitis
- B Cirrhosis
- C Hepatoma
- D All of the above

510 α_1 antitrypsin deficiency can predispose to which of the following skin disorders ?*Lancet 2005;365:2225-36*

- A Pemphigus
- B Panniculitis
- C Psoriasis
- D All of the above

α_1 -AT deficiency can predispose to lung disease (emphysema, bronchiectasis), liver disorders (chronic hepatitis, cirrhosis, hepatoma), skin disease (panniculitis), and vasculitis (anticytoplasmic antibody-positive vasculitis - Wegener's granulomatosis).

511 Emphysema associated with α_1 antitrypsin deficiency, distinctive features include ?*Lancet 2005;365:2225-36*

- A Early onset (fourth and fifth decade)
- B Panacinar pathology
- C Disproportionate involvement of lung bases
- D All of the above

Emphysema associated with α_1 -AT deficiency is early onset (IV & V decades), panacinar pathology, & disproportionate emphysematous involvement of lung bases (compared with more apical distribution seen in α_1 AT replete COPD).

- 512 In α_1 antitrypsin deficiency, retained α_1 antitrypsin aggregates are found in which organelle of hepatocytes as inclusions ?**

Lancet 2005;365:2225-36

- A. Endoplasmic reticulum
- B. Mitochondria
- C. Golgi apparatus
- D. All of the above

- 513 Which amino acid is essential in the reactive center of α_1 -antitrypsin to inhibit neutrophil elastase ?**

N Engl J Med 2002;346:45

- A. Serine
- B. Methionine
- C. Threonine
- D. Lysine

Inhibition is initiated by docking of protease with serpin. Alpha1-antitrypsin with a methionine at its reactive center inhibits neutrophil elastase.

- 514 Which of the following increase the risk of COPD in Pi^z subjects ?**

Harrison's 18th Ed. 2152

- A. Asthma
- B. Male gender
- C. Cigarette smoking
- D. All of the above

- 515 Which of the following is the most typical finding in COPD ?**

Harrison's 18th Ed. 2153

- A. Increase in the residual volume
- B. Persistent reduction in forced expiratory flow rates
- C. Increase in residual volume/total lung capacity ratio
- D. Nonuniform distribution of ventilation

Persistent reduction in forced expiratory flow rates is the most typical finding in COPD. Increases in residual volume & RV/TLC ratio, nonuniform distribution of ventilation & ventilation-perfusion mismatching also occur.

- 516 In COPD, at rest, Pa_{O_2} usually remains near normal until the FEV_1 is decreased to ?**

Harrison's 18th Ed. 2154

- A. ~ 25 % of predicted
- B. ~ 33 % of predicted
- C. ~ 50 % of predicted
- D. ~ 75 % of predicted

Pa_{O_2} usually remains near normal until the FEV_1 is decreased to ~50% of predicted at rest.

- 517 In COPD, Pa_{CO_2} usually remains near normal until the FEV_1 is decreased to ?**

Harrison's 18th Ed. 2154

- A. ~ 25 % of predicted
- B. ~ 33 % of predicted
- C. ~ 50 % of predicted
- D. ~ 75 % of predicted

In COPD, elevation of Pa_{CO_2} is not expected until FEV_1 is <25% of predicted.

- 518 Pulmonary hypertension leading to cor pulmonale & CHF due to COPD occurs in those with FEV_1 (<25% of predicted) and ?**

Harrison's 18th Ed. 2154

- A. Chronic hypoxemia (Pa_{O_2} < 75 mmHg)
- B. Chronic hypoxemia (Pa_{O_2} < 65 mmHg)
- C. Chronic hypoxemia (Pa_{O_2} < 55 mmHg)
- D. Chronic hypoxemia (Pa_{O_2} < 45 mmHg)

PHT severe enough to cause cor pulmonale & RVF due to COPD occurs only in those who have marked decreases in FEV_1 (<25% of predicted) together with chronic hypoxemia (Pa_{O_2} <55 mmHg).

- 519 Which of the following accounts most for the reduction in Pa_{O_2} that occurs in COPD ?**

Harrison's 18th Ed. 2154

- A. Bronchospasm
- B. Shunting
- C. Ventilation / perfusion mismatching
- D. Bronchial tree plugging

Ventilation/perfusion mismatching accounts for all of the reduction in Pa_{O_2} that occurs in COPD. Shunting is minimal.

- 520 Which of the following is responsible for physiologic alterations that occur with COPD ?**

Harrison's 18th Ed. 2154

- A. Large airways
- B. Medium airways
- C. Small airways and alveolar space
- D. All of the above

Changes in large airways cause cough and sputum, while changes in small airways and alveoli are responsible for physiologic alterations.

- 521 Which of the following is responsible for increased resistance in most individuals with COPD ?**

Harrison's 18th Ed. 2154

- A. Large airways
- B. Medium airways
- C. Small airways
- D. All of the above

Major site of increased resistance in COPD is in airways ≤ 2 mm diameter.

- 522 Cells secreting surfactant are called ?**

Harrison's 18th Ed. 2154

- A. Kulchitsky cell
- B. Clara cell
- C. Langerhans cell
- D. C cell

In COPD, characteristic cellular changes include goblet cell metaplasia, with these mucus-secreting cells replacing surfactant-secreting Clara cells. Reduced surfactant may increase surface tension at the air-tissue interface, predisposing to airway narrowing or collapse.

- 523 Gas exchanging airspaces include ?**

Harrison's 18th Ed. 2154

- A. Respiratory bronchiole
- B. Alveolar duct
- C. Alveoli
- D. All of the above

Gas-exchanging airspaces are respiratory bronchioles, alveolar ducts and alveoli. Emphysema is characterized by destruction of all these three.

524 Which of the following is false in smokers ?*Harrison's 18th Ed. 2154*

- A. In BAL fluid, macrophages are > 95% of total cell count
- B. Neutrophils account for 1 to 2 % of cells
- C. CD8+ T lymphocytes are increased in alveolar space
- D. None of the above

In smokers' BAL fluid, macrophages comprise >95% of the total cell count, and neutrophils, nearly absent in nonsmokers' lavage, account for 1–2% of the cells. CD8+ lymphocytes are also increased in alveolar space of smokers.

525 Which of the following is false ?*Harrison's 18th Ed. 2154*

- A. Panacinar emphysema is seen in α_1 AT deficiency
- B. Centriacinar emphysema is seen in cigarette smokers
- C. Panacinar emphysema has predilection for upper lobes
- D. Centriacinar emphysema is most prominent in the upper lobes and superior segments of lower lobes

Panacinar emphysema is usually observed in patients with alpha₁AT deficiency, and has a predilection for the lower lobes.

526 Principal feature of advancing COPD is ?*Harrison's 18th Ed. 2156*

- A. Worsening dyspnea on exertion
- B. Cough
- C. Sputum production
- D. All of the above

Three most common symptoms in COPD are cough, sputum production & exertional dyspnea. As COPD advances, the principal feature is worsening dyspnea on exertion.

527 Sitting in "tripod" position, facilitates action of which of the following muscles ?*Harrison's 18th Ed. 2156*

- A. Sternocleidomastoid muscle
- B. Scalene muscle
- C. Intercostal muscles
- D. All of the above

Use of accessory muscles of respiration is done by sitting in characteristic "tripod" position that facilitates the actions of sternocleidomastoid, scalene, and intercostal muscles.

528 Which of the following is a poor prognostic factor in COPD ?*Harrison's 18th Ed. 2156*

- A. Diffuse loss of subcutaneous adipose tissue
- B. Significant weight loss
- C. Bitemporal wasting
- D. All of the above

Independent poor prognostic factors in advanced COPD are systemic wasting, significant weight loss, bitemporal wasting & diffuse loss of subcutaneous adipose tissue.

529 Systemic wasting in advanced COPD is related to ?*Harrison's 18th Ed. 2156*

- A. Neutrophil elastase
- B. Matrix metalloproteinase-12 (MMP-12)
- C. TNF- α
- D. Transforming growth factor β (TGF- β)

Systemic wasting in advanced COPD is related to both inadequate oral intake and elevated levels of inflammatory cytokines (TNF- α).

530 In COPD, Hoover's sign refers to ?*Harrison's 18th Ed. 2156*

- A. Use of accessory muscles
- B. Pursed-lip breathing
- C. Diffuse loss of subcutaneous adipose tissue
- D. Paradoxical inward movement of rib cage with inspiration

Hoover's sign refers to paradoxical inward movement of rib cage with inspiration.

531 Which of the following is not a sign of COPD ?*Harrison's 18th Ed. 2156*

- A. Expiratory wheezing
- B. Bitemporal wasting
- C. Clubbing of the digits
- D. Right heart failure

Clubbing of the digits is not a sign of COPD, and its presence should alert the clinician to rule out lung cancer or else.

532 Which of the following is the basis for Gold criteria for COPD severity ?*Harrison's 18th Ed. 2156*

- A. Airflow obstruction
- B. Exercise performance
- C. Arterial blood gases and oximetry
- D. Body mass index

The hallmark and important prognostic factor of COPD is airflow obstruction and is the basis for the Global Initiative for Lung Disease (GOLD) classification for COPD severity.

533 Which of the following interventions does not influence the natural history of patients with COPD ?*Harrison's 18th Ed. 2157*

- A. Antibiotics
- B. Smoking cessation
- C. Oxygen therapy in chronically hypoxemic patients
- D. Lung volume reduction surgery

Only three interventions i.e. smoking cessation, oxygen therapy in chronically hypoxemic patients, and lung volume reduction surgery in selected patients with emphysema influence the natural history of patients with COPD.

534 Cigarette smoking increases risk for which of the following ?*Lancet 2004;364:791-802*

- A. Atherosclerotic vascular disease
- B. Osteoporosis
- C. Peptic ulcer disease
- D. All of the above

Cigarette smoking increases atherosclerotic vascular disease risk, osteoporosis & peptic ulcer disease.

535 The other action of 'Bupropion' used in nicotine replacement therapy is ?*Lancet 2004;364:791-802*

- A. Antihypertensive
- B. Antidepressant
- C. Anticholinergic
- D. Analgesic

Antidepressant bupropion is shown to be effective in smoking cessation.

536 Bupropion use is contraindicated in patients of ?

Lancet 2004;364:791-802

- A. Diabetes mellitus
- B. Hypertension
- C. Seizure
- D. Hypothyroidism

Bupropion is contraindicated in those with increased risk of seizures.

537 Which of the following drugs have been found useful in smoking cessation ?

Harrison's 18th Ed. 738, Lancet 2004;364:791-802

- A. Clonidine
- B. Nortriptyline
- C. Varenicline
- D. All of the above

Clonidine & tricyclic antidepressant nortriptyline have been found useful in smoking cessation as second-line treatments. Varenicline is an $\alpha_4\beta_2$ nicotinic acetylcholine receptor partial agonist.

538 Adverse effect of Varenicline is ?

Harrison's 18th Ed. 738

- A. Dysphagia
- B. Suicidal ideation
- C. Hemoptysis
- D. Seizure

Therapy with an antidepressant bupropion or nicotine replacement therapy with varenicline are approved by USFDA as first-line treatments for nicotine dependence. Both drugs increase suicidal ideation and must be used with caution. Varenicline is more efficacious than bupropion or placebo.

539 Nicotine replacement therapy can be carried out by all routes except ?

Harrison's 18th Ed. 2157

- A. Per rectal
- B. Transdermal patches
- C. Inhaler
- D. Nasal spray

Nicotine replacement therapy is available as gum, transdermal patches, inhaler & nasal spray.

540 Bronchodilator effect of anticholinergics is due to blocking the action of acetylcholine on ?

Lancet 2004;364:791-802

- A. M1 muscarinic receptors
- B. M2 muscarinic receptors
- C. M3 muscarinic receptors
- D. M4 muscarinic receptors

Anticholinergics are effective bronchodilators because they block the action of acetylcholine on M3 muscarinic receptors that induce contraction on airway smooth muscle.

541 Which of the following is a long-acting β_2 adrenergic receptor agonist ?

Lancet 2004;364:791-802

- A. Formoterol fumarate
- B. Albuterol sulfate
- C. Tiotropium bromide
- D. None of the above

542 Besides bronchodilator action, theophylline also has which of the following therapeutic effects ?

Lancet 2004;364:791-802

- A. Anti-inflammatory effects
- B. Inotropic & diuretic effects
- C. Augmenting skeletal muscle strength
- D. All of the above

Besides the bronchodilator effects of theophylline in COPD, it has anti-inflammatory, inotropic and diuretic effects and has effects in augmenting skeletal muscle strength.

543 Only therapy demonstrated to decrease mortality in COPD patients is ?

Harrison's 18th Ed. 2158

- A. Supplemental oxygen
- B. Beta agonists
- C. Theophylline
- D. Glucocorticoids

Supplemental O_2 is the only pharmacologic therapy demonstrated to decrease mortality in COPD.

544 Which of the following is an action of N-acetyl cysteine ?

Harrison's 18th Ed. 2158

- A. Antioxidant
- B. Anti-inflammatory
- C. Bronchodilator
- D. Mast cell stabilizer

N-acetyl cysteine is used in COPD patients for its mucolytic and antioxidant properties.

545 Eligibility for α_1 antitrypsin augmentation therapy requires a serum α_1 antitrypsin level of ?

Harrison's 18th Ed. 2158

- A. $< 6 \mu M$
- B. $< 8 \mu M$
- C. $< 10 \mu M$
- D. $< 11 \mu M$

Eligibility for α_1 antitrypsin augmentation therapy requires a serum α_1 antitrypsin level $< 11 \mu M$ ($\sim 50 \text{ mg/dL}$) Pz & null-null individuals and not in those with normal pulmonary function and a normal chest CT scan.

546 Which of the following vaccines is recommended before administering α_1 antitrypsin augmentation therapy ?

Harrison's 18th Ed. 2158

- A. Influenza vaccine
- B. Polyvalent pneumococcal vaccine
- C. Hepatitis B vaccination
- D. All of the above

Despite sterilization procedures for blood-derived products and the absence of reported cases of viral infection from α_1 antitrypsin augmentation therapy, some physicians recommend hepatitis B vaccination prior to starting augmentation therapy.

547 LVRS is used in the management of ?

Harrison's 18th Ed. 2158

- A. Bronchial asthma
- B. ILD
- C. Chronic bronchitis
- D. Emphysema

Lung volume reduction surgery (LVRS) reduce volume of lung in emphysema.

- 548 Lung volume reduction surgery (LVRS) is not recommended if pulmonary artery systolic pressure is ?**

Harrison's 18th Ed. 2158

- A. > 15 mmHg
- B. > 25 mmHg
- C. > 35 mmHg
- D. > 45 mmHg

LVRS is not recommended if patients of emphysema have significant pleural disease, a pulmonary artery systolic pressure >45 mmHg, extreme deconditioning, congestive heart failure, or other severe comorbid conditions.

- 549 Patients with which of the following are not candidates for LVRS ?**

Harrison's 18th Ed. 2158

- A. FEV₁ < 20% of predicted
- B. Diffusely distributed emphysema on CT scan
- C. DL_{CO} < 20% of predicted
- D. All of the above

- 550 Patients with which of the following are most likely to benefit from LVRS ?**

Harrison's 18th Ed. 2158

- A. Upper lobe predominant emphysema
- B. Middle lobe predominant emphysema
- C. Lower lobe predominant emphysema
- D. Any of the above

Patients with upper lobe predominant emphysema and a low postrehabilitation exercise capacity are most likely to benefit from LVRS.

- 551 Bacteria frequently implicated in COPD exacerbations include all except ?**

Harrison's 18th Ed. 2159

- A. Streptococcus pneumoniae
- B. Haemophilus influenzae
- C. Staphylococcus aureus
- D. Moraxella catarrhalis

Bacteria frequently implicated in COPD exacerbations include S. pneumoniae, H. influenzae, Moraxella catarrhalis, M. pneumoniae or Chlamydia pneumoniae.

- 552 Which of the following is not a parameter in 'BODE score' used as a predictor for COPD mortality ?**

Lancet 2004;364:985-996

- A. Breathing rate
- B. Airflow obstruction
- C. Dyspnoea
- D. Exercise capacity

- 553 Which of the following drugs is not included in the "not recommended or contraindicated" list in GOLD guidelines ?**

Lancet 2004; 364: 791-802 Table 2

- A. Mucolytics
- B. Narcotics
- C. Antitussives
- D. Vasodilators

Use of mucolytic, antioxidant, immunoregulators, respiratory stimulants is not recommended in pharmacological treatments of COPD. Antitussives & vasodilators are contraindicated. Narcotics can relieve dyspnoea (potentially dangerous due to ventilatory suppression) & is used to manage symptoms in terminal situations.

- 554 Which of the following is true as "Lung regeneration agent" ?**

Lancet 2004;364:985-996

- A. Retinoic acid (all-trans)
- B. Retinoic acid receptor γ agonists
- C. Stem cells
- D. All of the above

Lung regeneration agents include Retinoic acid (all-trans), Retinoic acid receptor γ agonists & Stem cells.

- 555 Which of the following is used in the "Augmentation therapy" of COPD ?**

Lancet 2005;365:2225-36

- A. Smoking cessation
- B. Vaccines
- C. Human plasma α 1 antitrypsin
- D. Supplemental oxygen

In COPD, specific treatment of α 1-AT deficiency consists of infusion of purified pooled human plasma α 1 antitrypsin - known as augmentation therapy.

- 556 Pooled human plasma is the source of which of the following preparations of purified α 1 antitrypsin ?**

Lancet 2005;365:2225-36

- A. Prolastin
- B. Aralast
- C. Zemaira
- D. All of the above

- 557 Which season is appropriate for giving influenza vaccination yearly in patients of COPD ?**

Lancet 2004;364:791-802

- A. Autumn
- B. Winter
- C. Spring
- D. Summer

Influenza vaccination reduces serious illness & death in COPD patients by 50%. Vaccination should be given once in autumn.

- 558 Etiological factor in acute exacerbations of COPD includes ?**

Lancet 2004;364:883-895

- A. Viral infections
- B. Bacterial infections
- C. Particulate air pollutants
- D. All of the above

Main aetiological factors in acute exacerbations of COPD are viral & bacterial infections & air pollutants.

- 559 Risk factors predicting increased hospital admission for acute exacerbations in COPD include all except ?**

Lancet 2004;364:883-895

- A. Low body-mass index
- B. High arterial carbon dioxide tension (PaCO₂)
- C. Degree of hypoxaemia
- D. High mean pulmonary arterial pressure

- 560 Risk factors predicting increased hospital admission for acute exacerbations in COPD include all except ?**

Lancet 2004;364:883-895

- A. Gas-exchange impairment

- B. Severity of airflow obstruction
- C. High arterial carbon dioxide tension (PaCO_2)
- D. High mean pulmonary arterial pressure

Neither the severity of airflow obstruction nor the degree of hypoxaemia are predictive of hospital admission in COPD

561 Which of the following is an effective respiratory stimulant ?

Lancet 2004;364:883-895

- A. Doxapram
- B. Cilomilast
- C. Gefitinib
- D. Batimastat

Doxapram is an effective respiratory stimulant and can provide only minor short-term improvement in blood gas tensions in COPD.

Chapter 261. Interstitial Lung Diseases

562 ILDs involves which of the following in lung parenchyma ?

Harrison's 18th Ed. 2160

- A. Capillary endothelium
- B. Perivascular tissues
- C. Lymphatic tissues
- D. All of the above

ILDs involve parenchyma of lung - alveoli, alveolar epithelium, capillary endothelium, & spaces between these structures, as well as perivascular & lymphatic tissues.

563 Lung response is alveolitis, interstitial inflammation and fibrosis in all of the following ILDs except ?

Harrison's 18th Ed. 2161, Table 261-1

- A. Hypersensitivity pneumonitis
- B. Goodpasture's syndrome
- C. Idiopathic pulmonary hemosiderosis
- D. Asbestosis

ILDs are groups in two based on the major underlying histopathology i.e. they are either associated with predominant inflammation and fibrosis or they have predominantly granulomatous reaction in interstitial or vascular areas. Hypersensitivity pneumonitis belongs to the later group.

564 Etiology of which of the following interstitial lung diseases is known ?

Harrison's 18th Ed. 2160

- A. Sarcoidosis
- B. Idiopathic pulmonary fibrosis (IPF)
- C. Pulmonary fibrosis associated with CTDs
- D. None of the above

Sarcoidosis, IPF and pulmonary fibrosis associated with connective tissue diseases (CTD) are the most common ILDs of unknown etiology. Among the ILDs of known cause, the largest group includes occupational & environmental exposures.

565 Which of the following statements about ILDs is false ?

Harrison's 18th Ed. 2160

- A. Non-malignant disorders
- B. Not caused by identified infectious agents
- C. May have granulomatous or inflammatory/fibrosis pattern
- D. None of the above

ILDs are nonmalignant disorders not caused by identified infectious agents. Two major histopathologic patterns are granulomatous or inflammation & fibrosis.

566 Granulomas in granulomatous lung disease consists of ?

Harrison's 18th Ed. 2160

- A. T lymphocytes
- B. Macrophages
- C. Epithelioid cells
- D. All of the above

Granulomas in granulomatous lung disease consists of T lymphocytes, macrophages, and epithelioid cells organized into discrete structures in the lung parenchyma. Granulomatous lesions can progress to fibrosis. Sarcoidosis and hypersensitivity pneumonitis are prime examples.

567 The initial insult leading to inflammation and fibrosis in ILD is to ?

Harrison's 18th Ed. 2160

- A. Vascular endothelium
- B. Epithelial surface
- C. Perivascular tissues
- D. Lymphatic tissues

The initial insult is an injury to the epithelial surface that causes inflammation in the air spaces and alveolar walls. Inflammation spreads to adjacent portions of interstitium and vasculature and eventually causes interstitial fibrosis.

568 Myfibroblasts produce which of the following ?

Harrison's 18th Ed. 2163, Figure 261-2

- A. Angiotensinogen
- B. Gelatinases
- C. Collagens
- D. All of the above

569 Patients with idiopathic pulmonary fibrosis typically have all the following features except ?

N Engl J Med. 2001; 345:517

- A. Exertional dyspnea
- B. Productive cough
- C. Fine bibasilar inspiratory crackles
- D. An abnormal chest radiograph on presentation

570 Which of the following initial features is most frequent in ILD patients ?

Harrison's 17th Ed. 1643

- A. Wheezing
- B. Chest pain
- C. Progressive exertional dyspnea
- D. Hemoptysis

Patients with ILDs seek medical attention mainly due to progressive exertional dyspnea or a persistent, nonproductive cough. Hemoptysis, wheezing, and chest pain may be present.

571 ILDs with symptoms and signs form a chronic presentation include all except ?

Harrison's 18th Ed. 2161

- A. Sarcoidosis
- B. Pulmonary Langerhans cell histiocytosis (PLCH)
- C. Churg-Strauss syndrome
- D. IPF

ILDs with s/s as a chronic presentation (months to years) include IPF, sarcoidosis, pulmonary Langerhans cell histiocytosis (PLCH), pneumoconioses, and CTDs.

572 ILDs with acute presentation include all except ?*Harrison's 18th Ed. 2161*

- A. Sarcoidosis
- B. Eosinophilic pneumonia
- C. Hypersensitivity pneumonitis
- D. Churg-Strauss syndrome

Acute presentation (days to weeks) occurs with allergy (drugs, fungi, helminths), acute interstitial pneumonia (AIP), eosinophilic pneumonia, & hypersensitivity pneumonitis. Episodic presentations include eosinophilic pneumonia, hypersensitivity pneumonitis, COP, vasculitides, pulmonary hemorrhage, and Churg-Strauss syndrome.

573 ILDs that present at age < 50 years include all except ?*Harrison's 18th Ed. 2161*

- A. IPF
- B. Lymphangioleiomyomatosis (LAM)
- C. PLCH
- D. Sarcoidosis

Most patients with sarcoidosis, ILD associated with CTD, lymphangio-leiomyomatosis (LAM), PLCH, and inherited forms of ILD (familial IPF, Gaucher's disease, Hermansky-Pudlak syndrome) present between the ages of 20 and 40 years. Most patients with IPF are older than 50 years.

574 Interstitial lung disease in which of these conditions is more common in men ?*Harrison's 18th Ed. 2161*

- A. Lymphangioleiomyomatosis (LAM)
- B. Tuberous sclerosis
- C. Hermansky-Pudlak syndrome
- D. Rheumatoid arthritis

LAM & pulmonary involvement in tuberous sclerosis occur exclusively in premenopausal women. ILD in Hermansky-Pudlak syndrome & in CTDs is more common in women. ILD in rheumatoid arthritis (RA) is more common in men.

575 Familial lung fibrosis is associated with mutation in ?*Harrison's 18th Ed. 2161*

- A. Surfactant protein C gene
- B. Surfactant protein A2 gene
- C. ATP-binding cassette transporter A3 gene
- D. All of the above

Familial lung fibrosis is associated with mutations in surfactant protein C gene, surfactant protein A2 gene and ATP-binding cassette transporter A3 gene.

576 Autosomal recessive pattern of inheritance occurs in all except ?*Harrison's 18th Ed. 2161*

- A. Niemann-Pick disease
- B. Gaucher's disease
- C. Neurofibromatosis
- D. Hermansky-Pudlak syndrome

Family associations (with an autosomal dominant pattern) occur in tuberous sclerosis and neurofibromatosis. An autosomal recessive pattern of inheritance occurs in Niemann-Pick disease, Gaucher's disease, and the Hermansky-Pudlak syndrome.

577 Patients with all of the following are almost always current or former smokers except ?*Harrison's 18th Ed. 2162*

- A. Pulmonary Langerhans cell histiocytosis (PLCH)
- B. Lymphangioleiomyomatosis (LAM)
- C. Desquamative interstitial pneumonia (DIP)

D. Goodpasture's syndrome

Patients with PLCH, desquamative interstitial pneumonia (DIP), Goodpasture's syndrome, respiratory bronchiolitis, and pulmonary alveolar proteinosis are almost always current or former smokers. Two-thirds to 75% of patients with IPF have a history of smoking.

578 Which of the following is usually not a clinical feature of sarcoidosis ?*Harrison's 18th Ed. 2162*

- A. Dyspnea
- B. Wheezing
- C. Hemoptysis
- D. Substernal chest pain

Dyspnea is a common and prominent complaint in patients with ILD, especially sarcoidosis. Wheezing and clinically significant chest pain, though uncommon in ILD, is noted in patients with sarcoidosis. Frank hemoptysis rarely a presenting manifestations of sarcoidosis.

579 Differential diagnosis of sudden worsening of dyspnea with acute chest pain due to spontaneous pneumothorax in a case of ILD includes ?*Harrison's 18th Ed. 2162*

- A. PLCH
- B. Tuberous sclerosis
- C. LAM
- D. All of the above

Sudden worsening of dyspnea, especially if associated with acute chest pain, may indicate a spontaneous pneumothorax, which occurs in PLCH, tuberous sclerosis, LAM & neurofibromatosis.

580 Frank hemoptysis in ILD suggests the possibility which of the following ILDs?*Harrison's 18th Ed. 2162*

- A. Diffuse alveolar hemorrhage (DAH) syndromes
- B. Lymphangioleiomyomatosis (LAM)
- C. Tuberous sclerosis
- D. Any of the above

Frank hemoptysis and blood-streaked sputum are rarely presenting manifestations of ILD but can be seen in the diffuse alveolar hemorrhage (DAH) syndromes, LAM, tuberous sclerosis, and the granulomatous vasculitides.

581 Which of the following is a nonspecific finding common to ILDs ?*Harrison's 18th Ed. 2163*

- A. Raised LDH
- B. Antinuclear antibodies
- C. Anti-immunoglobulin antibodies (rheumatoid factors)
- D. Circulating immune complexes

Antinuclear antibodies, anti-immunoglobulin antibodies (rheumatoid factors), and circulating immune complexes are identified in some patients, even in the absence of a defined CTD. A raised LDH is a nonspecific finding common to ILDs.

582 Which of the following laboratory abnormality is common in sarcoidosis ?*Harrison's 18th Ed. 2163*

- A. Elevated serum angiotensin-converting enzyme level
- B. Presence of serum precipitins
- C. Antineutrophil cytoplasmic antibodies
- D. Anti-basement membrane antibodies

Elevation of serum ACE level is common in sarcoidosis.

583 In which of the following ILDs, nodular opacities in upper lung zones is frequent ?

Harrison's 18th Ed. 2163

- A. Sarcoidosis
- B. PLCH
- C. Chronic hypersensitivity pneumonitis
- D. All of the above

ILDs that show nodular opacities with a predilection for the upper lung zones include sarcoidosis, PLCH, chronic hypersensitivity pneumonitis, silicosis, berylliosis, RA (necrobiotic nodular form), and ankylosing spondylitis.

584 Which of the following chest x-ray findings is indicative of a poor prognosis in a case of ILD ?

Harrison's 18th Ed. 2163

- A. Bibasilar reticular pattern
- B. Honeycombing
- C. Nodular pattern of alveolar filling
- D. Mixed pattern of alveolar filling

Most common chest radiograph abnormality in ILD is a bibasilar reticular pattern. Radiographic finding of honeycombing suggests small cystic spaces & progressive fibrosis which carry a poor prognosis.

585 Pathologic changes that characterize idiopathic pulmonary fibrosis are all except ?

N Engl J Med. 2001; 345:517

- A. Predilection for peripheral subpleural parenchyma
- B. Fibrotic zones with associated honeycombing alternate with areas of relatively unaffected lung tissue
- C. Fibrotic areas vary in age and activity
- D. "Fibroblast foci" occur at sites of chronic lung injury

"Fibroblast foci" occur at sites of acute lung injury.

586 HRCT in idiopathic pulmonary fibrosis shows all except ?

Harrison's 18th Ed. 2164, Figure 261-3

- A. Bibasal peripheral lower lobe reticular opacities
- B. Peripheral "honeycombing"
- C. Traction bronchiectasis
- D. Pleural thickening

HRCT lung scans in IPF show patchy, predominantly basilar, subpleural reticular opacities, with traction bronchiectasis and honeycombing.

587 HRCT finding that goes against the diagnosis of idiopathic pulmonary fibrosis is ?

Harrison's 18th Ed. 2165

- A. Extensive ground-glass abnormality
- B. Nodular opacities with upper or mid-zone predominance
- C. Prominent hilar or mediastinal lymphadenopathy
- D. All of the above

HRCT findings that suggest an alternative diagnosis to IPF include extensive ground-glass abnormality, nodular opacities, upper or mid-zone predominance & prominent hilar or mediastinal lymphadenopathy.

588 Pulmonary-function test in patients with idiopathic pulmonary fibrosis will show ?

Harrison's 18th Ed. 2164

- A. Reduction in total lung capacity
- B. Reduction in functional residual capacity

- C. Reduction in residual volume
- D. All of the above

Most forms of ILD produce a restrictive defect with reduced total lung capacity (TLC), functional residual capacity, and residual volume. FEV₁ and FVC are reduced, but these changes are related to the decreased TLC. FEV₁/FVC ratio is usually normal or increased. Lung volumes decrease as lung stiffness worsens with disease progression.

589 Which of the following about decreased DL_{co} in most ILDs is false ?

Harrison's 18th Ed. 2164

- A. Common nonspecific finding in most ILDs
- B. Due to mismatching of ventilation & perfusion (V./Q.)
- C. Does not correlate with disease stage
- D. None of the above

590 Which of the following is rare in arterial blood gas analysis in ILDs ?

Harrison's 18th Ed. 2164

- A. Normal resting arterial blood gas
- B. Hypoxemia
- C. Carbon dioxide (CO₂) retention
- D. Respiratory alkalosis

Carbon dioxide (CO₂) retention is rare and is a manifestation of end-stage ILD.

591 Which of the following is a bronchoalveolar lavage (BAL) finding in sarcoidosis ?

Harrison's 18th Ed. 2165, Table 261-3

- A. Eosinophils > 25%
- B. Hemosiderin-laden macrophages
- C. CD4 : CD8 ratio > 3.5
- D. Atypical hyperplastic type II pneumocytes

592 Decreased CD4:CD8 ratio in bronchoalveolar lavage (BAL) is a feature of ?

Harrison's 18th Ed. 2165, Table 261-3

- A. Organizing pneumonia
- B. Eosinophilic lung disease
- C. Hypersensitivity pneumonitis
- D. Pulmonary Langerhans cell histiocytosis

593 Which of the following is false about idiopathic pulmonary fibrosis ?

Harrison's 18th Ed. 2165

- A. Most common form of idiopathic interstitial pneumonia
- B. Has a distinctly poor response to therapy
- C. Has a bad prognosis
- D. None of the above

594 Usual interstitial pneumonia (UIP), nonspecific interstitial pneumonia, organizing pneumonia etc are categories of ILD based on ?

Harrison's 18th Ed. 2160

- A. Clinical presentation
- B. Radiological findings
- C. Histopathologic patterns
- D. Response to treatment

Important histopathologic patterns found in ILDs include usual interstitial pneumonia (UIP), nonspecific interstitial pneumonia, respiratory bronchiolitis/desquamative interstitial pneumonia, organizing pneumonia, diffuse alveolar damage (acute or organizing), and lymphocytic interstitial pneumonia.

595 Histologic hallmark of Usual interstitial pneumonia (UIP) is ?

Harrison's 18th Ed. 2165

- A. Alternating areas of normal lung & interstitial inflammation
- B. Foci of proliferating fibroblasts
- C. Dense collagen fibrosis
- D. All of the above

The histologic hallmark and chief diagnostic criterion of UIP is a heterogeneous appearance at low magnification with alternating areas of normal lung, interstitial inflammation, foci of proliferating fibroblasts, dense collagen fibrosis, and honeycomb changes affecting peripheral, subpleural parenchyma most severely. Lesion is idiopathic and not associated with another condition.

596 Treatment options in Usual interstitial pneumonia (UIP) patient include all except ?

Harrison's 16th Ed. 1557

- A. Azathioprine
- B. Interferon alpha
- C. Colchicine
- D. Pirfenidone

597 In the treatment of Usual interstitial pneumonia (UIP), which of the following is an antifibrotic agents ?

Harrison's 16th Ed. 1557

- A. Colchicine
- B. Pirfenidone
- C. Interferon gamma-1b
- D. All of the above

Treatment options for Usual interstitial pneumonia (UIP) include glucocorticoids, cytotoxic agents like azathioprine, cyclophosphamide & antifibrotic agents like colchicine, pirfenidone, or interferon γ -1b.

598 Which of the following drug is effective in acute exacerbations of IPF ?

Harrison's 18th Ed. 2166

- A. Glucocorticoids
- B. Azathioprine
- C. Interferon gamma-1b
- D. None of the above

No therapy has been found to be effective in the management of acute exacerbations of IPF.

599 Which of the following about Idiopathic Nonspecific Interstitial Pneumonia (NSIP) is false ?

Harrison's 18th Ed. 2166

- A. Good prognosis
- B. Presents at a younger age
- C. Occurs in women who have never smoked
- D. None of the above

Idiopathic NSIP is a subacute restrictive process with presentation similar to IPF, most common in women of younger age who have never smoked.

600 Laboratory feature of NSIP is ?

Harrison's 18th Ed. 2166

- A. Honeycombing
- B. Uniformity of interstitial involvement
- C. Traction bronchiectasis

D. Pleural calcification

HRCT of NSIP shows bilateral, subpleural ground-glass opacities. Honeycombing is unusual. Key histopathologic features are uniformity of interstitial involvement across biopsy section.

601 Hamman Rich Syndrome is the name given to ?

Harrison's 18th Ed. 2166

- A. Acute interstitial pneumonia (AIP)
- B. Hypersensitivity pneumonitis
- C. Desquamative interstitial pneumonia (DIP)
- D. Respiratory bronchiolitis

Hamman Rich Syndrome refers to Acute interstitial pneumonia (AIP).

602 Which of the following is a fulminant form of ILD ?

Harrison's 18th Ed. 2166

- A. Acute interstitial pneumonia (AIP)
- B. Hypersensitivity pneumonitis
- C. Desquamative interstitial pneumonia (DIP)
- D. Respiratory bronchiolitis

AIP is a fulminant form of lung injury characterized histologically by diffuse alveolar damage on lung biopsy. Onset of drug-Induced ILD may be abrupt and fulminant, or insidious.

603 AIP is similar in presentation to ?

Harrison's 18th Ed. 2166

- A. Spontaneous pneumothorax
- B. Acute respiratory distress syndrome (ARDS)
- C. Bronchial asthma
- D. CHF

AIP is similar in presentation to acute respiratory distress syndrome (ARDS).

604 Which of the following is known as idiopathic BOOP ?

Harrison's 18th Ed. 2166

- A. Cryptogenic Organizing Pneumonia
- B. Desquamative interstitial pneumonia
- C. Respiratory bronchiolitis
- D. Lymphocytic interstitial pneumonia

Cryptogenic Organizing Pneumonia (COP) is also known as idiopathic BOOP (bronchiolitis obliterans with organizing pneumonia).

605 Which of the following ILD is associated with cigarette smoking ?

Harrison's 18th Ed. 2167

- A. Desquamative Interstitial Pneumonia (DIP)
- B. Respiratory Bronchiolitis - Associated ILD (RB-ILD)
- C. Pulmonary Langerhans Cell Histiocytosis (PLCH)
- D. All of the above

606 Which of the following is false about Desquamative interstitial pneumonia (DIP) ?

Harrison's 18th Ed. 2167

- A. Found exclusively in cigarette smokers
- B. Macrophages in intraalveolar spaces
- C. Minimal interstitial fibrosis
- D. Has a worse prognosis than IPF

DIP occurs exclusively in cigarette smokers. Histologic hallmark is extensive accumulation of macrophages in intraalveolar spaces with minimal interstitial fibrosis. DIP has a better prognosis than IPF.

607 Which of the following about Pulmonary Langerhans Cell Histiocytosis (PLCH) is false ?

Harrison's 18th Ed. 2167

- A Smoking-related
- B HRCT shows nodules & thin-walled cysts
- C Increased DL_{CO}
- D Persistent / progressive disease

Most frequent pulmonary function abnormality is a markedly reduced DL_{CO} along with restrictive disease pattern, airflow limitation & diminished exercise capacity.

608 Radiographic features of PLCH include all except ?

Harrison's 18th Ed. 2167

- A Reticular or nodular opacities
- B Bizarre-shaped, thin-walled upper zone cysts
- C Honeycombing
- D Sparing of the costophrenic angles

CxR of PLCH include a ill-defined or stellate nodules, reticular or nodular opacities, bizarre-shaped upper zone thin-walled cysts & sparing of costophrenic angles. Honeycombing is a feature of IPF.

609 Most common form of pulmonary involvement in connective tissue disorders is ?

Harrison's 18th Ed. 2167

- A Respiratory bronchiolitis
- B Desquamative interstitial pneumonia
- C Cryptogenic organizing pneumonia
- D Nonspecific interstitial pneumonia

Commonest form of pulmonary involvement in connective tissue disorders is nonspecific interstitial pneumonia.

610 Rheumatoid pneumoconiosis is also called ?

Harrison's 18th Ed. 2167

- A Hermansky-Pudlak syndrome
- B Churg-Strauss syndrome
- C Caplan's syndrome
- D Goodpasture's syndrome

Caplan's syndrome is the term given to rheumatoid pneumoconiosis.

611 Most common pulmonary manifestation in Systemic Lupus Erythematosus (SLE) is ?

Harrison's 18th Ed. 2167

- A Atelectasis
- B Pleuritis
- C Pulmonary vascular disease
- D Infectious pneumonia

Pleuritis with or without effusion is the most common pulmonary manifestation in SLE.

612 ILD occurs more commonly in the subgroup of polymyositis & dermatomyositis patients having which antibody ?

Harrison's 18th Ed. 2168

- A Anti-Smith antibody
- B Anti-Ro antibody
- C Anti-Jo-1 antibody
- D Anti-La antibody

80% of patients of PM/DM with anti-Jo-1 antibodies (directed to histidyl tRNA synthetase) have interstitial lung disease.

613 Which of the following about pulmonary alveolar proteinosis (PAP) is false ?

Harrison's 18th Ed. 2168

- A Impaired ability to process surfactant
- B Accumulation of PAS positive lipoproteinaceous material in distal air spaces
- C Extensive lung inflammation
- D Preserved lung architecture

There is a defect in macrophage function with impaired ability to process surfactant. Amorphous, PAS-positive lipoproteinaceous material accumulates in distal air spaces. There is little or no lung inflammation, and the underlying lung architecture is preserved.

614 In pulmonary alveolar proteinosis (PAP), the neutralizing IgG antibody is against which of the following ?

Harrison's 18th Ed. 2168

- A Surfactant
- B GM-CSF
- C PAS positive lipoproteinaceous material
- D All of the above

PAP is an autoimmune disease with neutralizing antibody of IgG isotype against granulocyte-macrophage colony-stimulating factor (GM-CSF). Neutralization of GM-CSF bioactivity by the antibody causes dysfunction of alveolar macrophages, which results in reduced surfactant clearance. Elevated serum anti-GM-CSF titer is highly sensitive & specific for diagnosis of acquired PAP.

615 Which of the following is the most common class of Pulmonary Alveolar Proteinosis (PAP) ?

Harrison's 18th Ed. 2168

- A Acquired
- B Congenital
- C Secondary
- D None of the above

There are three distinct classes of PAP. Acquired (>90%), congenital, and secondary.

616 Secondary pulmonary alveolar proteinosis (PAP) is caused by which of the following malignancies ?

Harrison's 18th Ed. 2168

- A Lung
- B Pleural
- C Hematopoietic
- D Hepatic

617 Secondary PAP is caused by ?

Harrison's 18th Ed. 2168

- A Lysinuric protein intolerance
- B Acute silicosis
- C Hematopoietic malignancies
- D All of the above

Secondary PAP is caused by lysinuric protein intolerance, acute silicosis, immuno-deficiency disorders, hematopoietic malignancies and hematopoietic disorders.

618 Congenital PAP is caused by mutation in ?

Harrison's 18th Ed. 2168

- A SP-A gene
- B SP-B gene
- C SP-C gene
- D SP-D gene

Congenital PAP is transmitted in autosomal recessive manner & is caused by mutation in SP-B gene.

619 In PAP, which of the following is frequent ?

Harrison's 18th Ed. 2168

- A. Polycythemia
- B. Hypergammaglobulinemia
- C. Increased LDH
- D. All of the above

Apart from elevated serum levels of lung surfactant proteins A & D, polycythemia, hypergammaglobulinemia and increased LDH levels are frequent in PAP.

620 Radiographically, 'bat-wing' distribution of lung opacities is suggestive of which of the following ?

Harrison's 18th Ed. 2168

- A. Churg-Strauss syndrome
- B. Pulmonary lymphangioleiomyomatosis (LAM)
- C. Pulmonary alveolar proteinosis (PAP)
- D. Goodpasture's syndrome

Radiographically, bilateral symmetric alveolar opacities located centrally in mid and lower lung zones result in a 'bat-wing' distribution in PAP.

621 Pulmonary lymphangioleiomyomatosis (LAM) is seen in ?

Harrison's 18th Ed. 2168

- A. Female child
- B. Premenopausal women
- C. Postmenopausal women
- D. Any of the above

Pulmonary LAM afflicts premenopausal women and should be suspected in young women with emphysema, recurrent pneumothorax, or chylous pleural effusion. The disease accelerates during pregnancy and abates after oophorectomy.

622 In Pulmonary lymphangioleiomyomatosis (LAM), there occurs proliferation of which of the following ?

Harrison's 18th Ed. 2168

- A. Type 1 pneumocytes
- B. Type 2 pneumocytes
- C. Pulmonary lymphatic vessels
- D. Atypical pulmonary interstitial smooth muscle

Pathologically, pulmonary LAM is characterized by the proliferation of atypical pulmonary interstitial smooth muscle and cyst formation.

623 Atypical smooth-muscle cells that proliferate in pulmonary lymphangioleiomyomatosis (LAM) react with which of the following monoclonal antibody ?

Harrison's 18th Ed. 2168

- A. HMB42
- B. HMB43
- C. HMB44
- D. HMB45

Immature-appearing smooth-muscle cells react with monoclonal antibody HMB45, which recognizes gp100 originally found in human melanoma cells.

624 Which of the following modalities of treatment is useful in Pulmonary lymphangioleiomyomatosis (LAM) ?

Harrison's 18th Ed. 2168

- A. Oophorectomy
- B. Progesterone
- C. Tamoxifen

D. All of the above

Oophorectomy, progesterone, sirolimus, tamoxifen & luteinizing hormone-releasing hormone analogues have been used in pulmonary LAM. Lung transplantation offers the only hope for cure.

625 Which of the following is not a type of diffuse interstitial disease ?

Harrison's 16th Ed. 1497

- A. Pneumoconiosis
- B. Hypersensitivity pneumonitis
- C. Eosinophilic granuloma
- D. Acute respiratory distress syndrome

626 Which of the following is not a type of diffuse alveolar disease ?

Harrison's 16th Ed. 1497

- A. Cardiogenic pulmonary edema
- B. Acute respiratory distress syndrome
- C. Sarcoidosis
- D. Eosinophilic granuloma

627 Injury to which of the following leads to hemoptysis in Diffuse Alveolar Hemorrhage ?

Harrison's 18th Ed. 2168

- A. Arterioles
- B. Venules
- C. Capillaries
- D. Any of the above

Syndromes of ILD with diffuse alveolar hemorrhage (DAH) may arise due to injury to arterioles, venules, and the alveolar septal capillaries. Bleeding into alveolar spaces results in hemoptysis secondary to disruption of alveolar-capillary basement membrane.

628 Which of the following is increased in Diffuse Alveolar Hemorrhage (DAH) ?

Harrison's 18th Ed. 2168 - 69

- A. PaO_2
- B. PAO_2
- C. DI_{CO}
- D. PaCO_2

In DAH, DI_{CO} may be increased due to increased hemoglobin within alveoli compartment.

629 Immune complexes are absent in examination of lung or renal tissue by immunofluorescent techniques in ?

Harrison's 18th Ed. 2169

- A. Granulomatosis with polyangiitis (Wegener's)
- B. Microscopic polyangiitis pauci-immune glomerulonephritis
- C. Isolated pulmonary capillaritis
- D. All of the above

Immune complexes are absent (pauci-immune) in examination of lung or renal tissue by immunofluorescent techniques in granulomatosis with polyangiitis (Wegener's), microscopic polyangiitis pauci-immune glomerulonephritis & isolated pulmonary capillaritis.

630 Linear deposition of immune complexes is seen in examination of lung or renal tissue by immunofluorescent techniques in ?

Harrison's 18th Ed. 2169

- A. SLE
- B. Goodpasture's syndrome
- C. Henoch-Schönlein purpura

- D. Wegener's granulomatosis

Linear deposition of immune complexes is seen in examination of lung or renal tissue by immunofluorescent techniques in Goodpasture's syndrome. Granular pattern is found in CTDs, particularly SLE. Granular deposition of IgA-containing immune complexes is seen in Henoch-Schönlein purpura.

631 Inherited diseases that produce interstitial lung disease include ?

Harrison's 18th Ed. 2169

- A. Tuberous sclerosis
- B. Neurofibromatosis
- C. Niemann-Pick disease
- D. All of the above

632 Inherited diseases that produce interstitial lung disease include ?

Harrison's 18th Ed. 2169

- A. Gaucher's disease
- B. Hermansky-Pudlak syndrome
- C. Niemann-Pick disease
- D. All of the above

Inherited disorders associated with ILD include phakomatoses, tuberous sclerosis, neurofibromatosis, Niemann-Pick disease, Gaucher's disease and Hermansky-Pudlak syndrome.

633 Which of the following is false about bronchocentric granulomatosis (BG) ?

Harrison's 18th Ed. 2169

- A. Descriptive clinical term
- B. Hypersensitivity reaction to Aspergillus
- C. Peripheral blood eosinophilia
- D. CxR may show irregularly shaped mass lesions

Rather than a specific clinical entity, BG is a descriptive histologic term.

634 Bronchocentric granulomatosis (BG) is associated with which of the following pulmonary condition ?

Harrison's 18th Ed. 2169

- A. Asthma
- B. Bacterial pneumonia
- C. Pleural effusion
- D. Primary spontaneous pneumothorax

BG is a pathologic nonspecific response to airway injuries. BG can be caused by a hypersensitivity reaction to Aspergillus in patients with asthma.

635 Treatment of choice in bronchocentric granulomatosis is ?

Harrison's 18th Ed. 2169

- A. Glucocorticoids
- B. Chemotherapy
- C. Surgery
- D. Radiation

Glucocorticoids are treatment of choice in bronchocentric granulomatosis (BG).

636 Which of the following is not a cause of solitary circumscribed pulmonary nodule ?

Harrison's 17th Ed. 1585 Table 245-2

- A. Wegener's granulomatosis
- B. Bronchogenic cyst

- C. Vascular malformation
- D. Sarcoidosis

Causes of solitary circumscribed density, nodule on CxR are primary or metastatic neoplasm, localized infection, Wegener's granulomatosis, Rheumatoid nodule, Vascular malformation and Bronchogenic cyst. Sarcoidosis leads to diffuse interstitial disease.

637 Which of the following is not a cause of diffuse nodular pulmonary disease ?

Harrison's 17th Ed. 1585 Table 245-2

- A. Metastatic neoplasm
- B. Sarcoidosis
- C. Pneumoconiosis
- D. Eosinophilic granuloma

Causes of diffuse nodular disease on CxR include metastatic neoplasm, hematogenous spread of infection, pneumoconiosis and eosinophilic granuloma.

638 Pulmonary hemorrhage syndromes include ?

Harrison's 17th Ed. 1643 Table 255-1

- A. Goodpasture's syndrome
- B. Idiopathic pulmonary hemosiderosis
- C. Isolated pulmonary capillaritis
- D. All of the above

639 Gastrointestinal / liver diseases that can produce interstitial lung disease include ?

Harrison's 17th Ed. 1643 Table 255-1

- A. Crohn's disease / ulcerative colitis
- B. Primary biliary cirrhosis
- C. Chronic active hepatitis
- D. All of the above

Chapter 329. Sarcoidosis

640 Besnier-Boeck-Schauman disease refers to ?

Boeck C. Multiple benign sarcoid of the skin. J Cutan Genitourin Dis 1899;17:543-50.

- A. Hydatid disease of lung
- B. Syphilis of lung
- C. Sarcoidosis
- D. Miliary tuberculosis

641 Condition known to cause granulomas is ?

Harrison's 18th Ed. 2805

- A. Fungal infections
- B. Malignancy
- C. Beryllium
- D. All of the above

Condition known to cause granulomas are sarcoidosis, mycobacterial and fungal infections, malignancy and environmental agents such as beryllium.

642 Which of the following is false about sarcoidosis ?

Harrison's 18th Ed. 2805

- A. Inflammatory disease
- B. Noncaseating granulomas
- C. Multisystem involvement

- D. Involvement in ≥ 3 organs for a specific diagnosis

Sarcoidosis is an inflammatory multisystem disease characterized by noncaseating granulomas. For a specific diagnosis, presence of involvement in two or more organs is required.

643 Which of the following has been implicated in the possible etiology of sarcoidosis ?

Harrison's 18th Ed. 2805

- A. Burkholderia pseudomallei
- B. Propionibacter acnes
- C. Capnocytophaga canimorsus
- D. Pseudomonads

Propionibacterium acnes is so far the only bacterium to be found in sarcoid lymph nodes. Bacterial components (MDP & IT27 antigen), demonstrated in sarcoid granulomas, strongly suggest the causative agent of sarcoidosis to be derived from some bacteria. P. acnes is indigenous to skin of healthy humans.

644 Highest prevalence of sarcoidosis is reported in ?

Harrison's 18th Ed. 2806

- A. Nordic population
- B. Hispanic population
- C. Aborigines in Australia
- D. Red Indian tribes

Sarcoidosis is seen worldwide, with highest prevalence reported in the Nordic population.

645 Organ most frequently affected in sarcoidosis is ?

Harrison's 18th Ed. 2810

- A. Lung
- B. Skin
- C. Eye
- D. Lymph node

Organ most frequently affected in sarcoidosis is lung. Involvement of skin, eye, liver & lymph nodes is also common.

646 Which of the following organs is least affected in sarcoidosis ?

Harrison's 18th Ed. 2810

- A. Heart
- B. Liver
- C. Ovary
- D. Central nervous system

Any organ can be threatened by sarcoidosis, but lung, eye, heart, liver, and central nervous system are at greatest risk. Sarcoidosis rarely involve breast, testes, ovary, or stomach.

647 Which of the following HLA haplotype is associated with an increased risk for developing sarcoidosis ?

Harrison's 18th Ed. 2806

- A. DRB1*0402
- B. DQB1*0302
- C. DRB1*1501
- D. DRB1*1101

*HLA-DRB1*1101 is associated with an increased risk for developing sarcoidosis. DRB1*0402 (Pemphigus vulgaris), DQB1*0302 (Type 1 DM), DRB1*1501 (Multiple sclerosis).*

648 Persistent chronic form of sarcoidosis is associated with the secretion of high levels of ?

Harrison's 18th Ed. 2806

- A. IL-8
- B. GM-CSF

- C. MCP-1

- D. Eotaxin

~20% of patients with sarcoidosis develop a chronic persistent form of the disease and is associated with the secretion of high levels of IL-8.

649 Löfgren's syndrome is characterized by ?

Harrison's 18th Ed. 2806

- A. Arthritis
- B. Erythema nodosum
- C. Bilateral hilar adenopathy
- D. All of the above

Löfgren's syndrome refers to an acute presentation of sarcoidosis consisting consists of erythema nodosum, hilar adenopathy and uveitis.

650 Which of the following HLA haplotype is highly associated with Löfgren's syndrome?

Harrison's 17th Ed. 2136

- A. DRB1*0402
- B. DQB1*0302
- C. DRB1*1501
- D. DQB1*0201

*HLA-DQB1*0201 is highly associated with Löfgren's syndrome. HLA-DRB1*03 was found in two-thirds of Scandinavian patients with Löfgren's syndrome.*

651 Disease that affect the upper lobe is ?

Harrison's 18th Ed. 2807

- A. Hypersensitivity pneumonitis
- B. Silicosis
- C. Langerhans cell histiocytosis
- D. All of the above

Diseases that affect the upper lobe are sarcoidosis, hypersensitivity pneumonitis, silicosis, Langerhans cell histiocytosis, tuberculosis & Pneumocystis pneumonia.

652 The classic cutaneous lesion in sarcoidosis is ?

Harrison's 18th Ed. 2808

- A. Erythema nodosum
- B. Hyper- and hypopigmentation
- C. Keloid formation
- D. All of the above

Classic cutaneous lesions in sarcoidosis include erythema nodosum, maculopapular lesions, hyper- and hypopigmentation, keloid formation, and subcutaneous nodules. and subcutaneous nodules.

653 The location of lesions in "lupus pernio" is on ?

N Engl J Med 2007;357:2153-65

- A. Nape of the neck
- B. Cheek and nose
- C. Heel
- D. Elbows

Lupus pernio is the term for chronic sarcoidosis-related indurated, lumpy, violaceous, blue-purple lesions on nose, cheeks, lips, ears, fingers & knees. It can be disfiguring by eroding into underlying cartilage & bone.

654 Violaceous papules and plaques are seen in ?

Harrison's 16th Ed. 309

- A. Lupus pernio
- B. Lymphoma cutis

- C. Cutaneous lupus
- D. All of the above

Violaceous papules and plaques are seen in lupus pernio, lymphoma cutis & cutaneous lupus.

655 Most common abnormality of liver function in sarcoidosis is ?

Harrison's 18th Ed. 2808

- A. Elevation of alkaline phosphatase level
- B. Elevation of transaminase levels
- C. Elevation of bilirubin level
- D. None of the above

The most common abnormality of liver function is an elevation of the alkaline phosphatase level, consistent with an obstructive pattern.

656 Most common hematologic problem in sarcoidosis is ?

Harrison's 18th Ed. 2809

- A. Anemia
- B. Lymphopenia
- C. Leukopenia
- D. Thrombocytopenia

Most common hematologic problem in sarcoidosis is lymphopenia.

657 Mechanism of hypercalcemia and/or hypercalciuria in sarcoidosis is ?

Harrison's 18th Ed. 2809

- A. Increased production of 1,25-dihydroxyvitamin D by granuloma
- B. Suppressed parathyroid hormone (PTH) level
- C. Increased ACE levels
- D. All of the above

Mechanism of hypercalcemia and/or hypercalciuria in sarcoidosis is Increased production of 1,25-dihydroxyvitamin D by granuloma.

658 Which out of the following is the most common neurologic presentation in sarcoidosis ?

N Engl J Med 2007;357:2153-65

- A. Cranial-nerve palsies
- B. Ataxia
- C. Cognitive dysfunction
- D. Seizures

Most common neurological presentations in sarcoidosis, listed in decreasing order of frequency, are cranial-nerve palsies, headache, ataxia, cognitive dysfunction, weakness & seizures.

659 Which cranial nerve is most commonly involved in sarcoidosis ?

Harrison's 18th Ed. 2809

- A. III
- B. V
- C. VI
- D. VII

Seventh cranial nerve involvement with unilateral facial paralysis is most common in sarcoidosis. Optic neuritis is also a cranial nerve manifestation of sarcoidosis.

660 Which of the following can be a feature of neurosarcoidosis ?

Harrison's 18th Ed. 2809

- A. Basilar meningitis
- B. Myelopathy
- C. Anterior hypothalamic disease

- D. All of the above

Areas of nervous system affected in neurosarcoidosis include cranial nerve involvement, basilar meningitis, myelopathy, anterior hypothalamic disease (diabetes insipidus), seizures & cognitive changes.

661 Endocrine abnormality most commonly seen in sarcoidosis is ?

Harrison's 18th Ed. 2809

- A. Diabetes insipidus
- B. Complete hypopituitarism
- C. Addison's syndrome
- D. Infertility

Hypothalamic-pituitary axis is most commonly involved in sarcoidosis & presents as diabetes insipidus. Complete hypopituitarism & infertility are rare. Addison's syndrome has been described.

662 Which of the following is not a feature of Heerfordt-Waldenstrom syndrome ?

Harrison's 16th Ed. 2019

- A. Fever
- B. Parotid enlargement
- C. Posterior uveitis
- D. Facial nerve palsy

Heerfordt-Waldenstrom syndrome describes individuals with fever, parotid enlargement, anterior uveitis & facial nerve palsy.

663 Which of the following is not a feature of lymphadenopathy in sarcoidosis ?

Harrison's 16th Ed. 2020

- A. Rubbery texture
- B. Painless
- C. Ulcerate
- D. Nonadherent

Lymph nodes in sarcoidosis are firm, painless, nonadherent with a rubbery texture. Unlike tuberculosis, the nodes do not ulcerate.

664 Which of the following is not involved in Familial juvenile systemic granulomatosis or Blau's syndrome ?

N Engl J Med 2007;357:2153-65

- A. Joints
- B. Skin
- C. Lungs
- D. Eye

Familial juvenile systemic granulomatosis, also called Blau's syndrome, bears some similarities to childhood sarcoidosis. Children with Blau's syndrome present with granulomatous arthritis and skin and eye involvement but the lungs are not involved. The Kveim-Siltzbach skin test is negative.

665 In Sarcoidosis, which of the following is instrumental in initiating the formation and maintenance of granulomas ?

N Engl J Med 2007;357:2153-65

- A. Tumor necrosis factor alpha
- B. CD4+ T cells
- C. Macrophage inflammatory protein 1 (MIP-1)
- D. GM-CSF

Antigen-presenting cells (APC), in addition to producing high levels of tumor necrosis factor alpha, secrete interleukin-12, -15, and -18, MIP-1, monocyte chemoattractant protein 1 (MCP-1), and GM-CSF. A cardinal feature of sarcoidosis is the presence of CD4+ T cells that interact with APCs to initiate the formation & maintenance of granulomas. CD4+ T cells release IL-2 & interferon-alpha.

666 Which of the following about active sarcoidosis is false ?

Harrison's 16th Ed. 2019

- A Large numbers of activated T_H1 cells in affected organs
- B T cells in nonaffected organs are quiescent
- C Hyperglobulinemia
- D None of the above

T_H1 lymphocytes accumulate at sites of disease and proliferate at an exaggerated rate that is maintained by spontaneous release of interleukin (IL) 2, T cell growth factor by activated TH1 cells locally. Numbers of T_H1 cells in blood are normal or slightly reduced. In the involved organs, the ratio of CD4+ to CD8+ T cells may be high (10:1) compared to ratio of 2:1 found in normal tissues or in blood of affected individuals. Active sarcoidosis is also characterized by hyperglobulinemia.

667 Which of the following is an infrequent constituent of sarcoidal granuloma ?

N Engl J Med 2007;357:2153-65

- A Epithelioid cells
- B T cells
- C B cells
- D Macrophage

Sarcoidal granulomas are organized, structured masses composed of macrophages & their derivatives, epithelioid cells, giant cells & T cells. Sarcoidal granulomas may persist, resolve, or lead to fibrosis.

668 The most common mechanism for pulmonary hypertension in sarcoidosis is ?

N Engl J Med 2007;357:2153-65

- A Fibrosis with obliteration of pulmonary vessels
- B Granulomatous infiltration of pulmonary arterioles
- C Hyperviscosity
- D Cardiac dysfunction

Fibrosis and the resulting obliteration of the pulmonary vessels is the most common mechanism for pulmonary hypertension in sarcoidosis, although granulomatous infiltration of the pulmonary arterioles can cause pulmonary hypertension in the absence of pulmonary fibrosis.

669 Which of the following is typically unilateral in sarcoidosis ?

Harrison's 16th Ed. 2020

- A Hilar lymphadenopathy
- B Parotid enlargement
- C Pleural effusion
- D Erythema nodosum

Pleural involvement in sarcoidosis almost always is unilateral pleural effusion. Hilar lymphadenopathy is almost always bilateral. Parotid enlargement is a classic feature of sarcoidosis & bilateral involvement is the rule. Erythema nodosum comprises of bilateral, tender red nodules on anterior surface of legs.

670 Which of the following observation helps to differentiate neurosarcoidosis from multiple sclerosis ?

Harrison's 18th Ed. 2809

- A Meningeal enhancement
- B Hypothalamic involvement
- C Pulmonary or skin involvement
- D All of the above

Optic neuritis occurs in both neurosarcoidosis & multiple sclerosis. Multiple enhancing white matter abnormalities in MRI suggest multiple sclerosis. Presence of meningeal enhancement or hypothalamic involvement and evidence of extraneurologic disease such as pulmonary or skin involvement suggests neurosarcoidosis.

671 Which of the following occurs due to cardiac involvement in sarcoidosis ?

Harrison's 18th Ed. 2809

- A Congestive heart failure (CHF)

- B Cardiac arrhythmias
- C Heart blocks
- D Any of the above

Cardiac disease in sarcoidosis presents as CHF, cardiac arrhythmias or conduction blocks due to infiltration of heart muscle by granulomas.

672 The most common location for sarcoid granulomas and scars in the heart is ?

N Engl J Med 2007;357:2153-65

- A Inter atrial septum
- B Inter ventricular septum
- C Left ventricular free wall
- D Right ventricular free wall

The most common location for granulomas and scars is the left ventricular free wall, followed by the intraventricular septum, often with involvement of the conducting system.

673 In sarcoidosis, fatigue is linked to which of the following ?

Harrison's 18th Ed. 2810

- A Myelopathy
- B Small peripheral nerve fiber disease
- C Basilar meningitis
- D Anterior hypothalamic disease

A link between fatigue & small peripheral nerve fiber disease is noted in sarcoidosis.

674 Which of the following is a complication of sarcoidosis ?

Harrison's 18th Ed. 2810

- A Blindness
- B Paraplegia
- C Renal failure
- D All of the above

Sarcoidosis complications include blindness, paraplegia, renal failure, respiratory infection & failure.

675 By chest radiographs, Stage 3 sarcoidosis refers to which of the following ?

N Engl J Med 2007;357:2153-65

- A Bilateral hilar lymphadenopathy without infiltration
- B Bilateral hilar lymphadenopathy with infiltration
- C Infiltration alone
- D Fibrotic bands, bullae, hilar retraction, bronchiectasis, and diaphragmatic tenting

In sarcoidosis, CxR wise, stage 1 is bilateral hilar lymphadenopathy without infiltration, stage 2 is bilateral hilar lymphadenopathy with infiltration, stage 3 is infiltration alone and stage 4 is fibrotic bands, bullae, hilar retraction, bronchiectasis and diaphragmatic tenting. These stages do not indicate disease chronicity or correlate with changes in pulmonary function.

676 What measure of lymphadenopathy in CT short axis supports the diagnosis of sarcoidosis over other ILDs ?

Harrison's 18th Ed. 2810

- A > 0.5 cm
- B > 1.0 cm
- C > 1.5 cm
- D > 2.0 cm

Adenopathy >2 cm in CT short axis favours diagnosis of sarcoidosis over other interstitial lung diseases.

677 Which of the following is least helpful in defining active sarcoidosis ?

Harrison's 18th Ed. 2810

- A. Gallium-67 lung scan
- B. Bronchoalveolar lavage findings
- C. Computed tomography
- D. Serum level of ACE

Gallium-67 lung scans, BAL & serum ACE level help in defining sarcoidosis disease activity. CT chest is rarely helpful for either diagnosis or prognosis but can identify early fibrosis.

678 Serum levels of ACE are elevated in approximately what percentage of patients with acute sarcoidosis ?

Harrison's 18th Ed. 2810

- A. One-third
- B. One-half
- C. Two-third
- D. Three-fourth

Elevated levels of ACE are reported in 60% of patients with acute disease and only 20% of patients with chronic sarcoidosis.

679 Significant elevation of ACE levels is seen in ?

Harrison's 18th Ed. 2810

- A. Leprosy
- B. Gaucher's disease
- C. Hyperthyroidism
- D. All of the above

Mild elevation of ACE is seen in diabetes. Elevations of >50% of upper limit of normal are seen in sarcoidosis, leprosy, Gaucher's disease, hyperthyroidism, and disseminated granulomatous infections such as miliary tuberculosis. ACE level is not elevated in malignancy.

680 Lower than normal levels of ACE is seen in ?

Harrison's 18th Ed. 2811

- A. Leprosy
- B. Miliary tuberculosis
- C. Hyperthyroidism
- D. Lymphoma

ACE level in lymphoma and patients on ACE inhibitor is lower than normal.

681 Biopsy from which of the following can be obtained for the diagnosis of sarcoidosis ?

Harrison's 18th Ed. 2810-11

- A. Liver
- B. Extrathoracic lymph node
- C. Muscle
- D. Any of the above

Biopsy from lung, skin lesion, liver, extrathoracic lymph node, endomyocardium or muscle can be obtained for the diagnosis of sarcoidosis.

682 Which of the following tests is least relevant in sarcoidosis ?

N Engl J Med 2007;357:2153-65

- A. 24-hour urinary excretion of calcium
- B. 24-hour proteinuria
- C. Slit-lamp, tonometric, and funduscopy examinations
- D. Serum angiotensin-converting enzyme

Hypercalcemia, hypercalciuria & renal calculi occur in sarcoidosis. 24-hour urinary excretion of calcium should be measured in all patients with sarcoidosis. Calcium metabolism is disturbed

because sarcoidal macrophages possess 25-hydroxyvitamin D-1alpha-hydroxylase, which converts 25-hydroxyvitamin D to more active vitamin D metabolite, 1,25 dihydroxyvitamin D. Eye & adnexa are involved in 25 to 80% of patients with sarcoidosis, necessitating routine slit-lamp and funduscopy examination. Anterior uveitis is more common than posterior uveitis. Sarcoidal granulomas produce angiotensin converting enzyme, & ACE levels are elevated in 60% of patients with sarcoidosis.

683 Panda sign and lambda sign relate to ?

Harrison's 18th Ed. 2811

- A. CxR
- B. BAL
- C. Gallium scan
- D. PET

Positive gallium scan can support the diagnosis of sarcoidosis if increased activity is noted in parotids & lacrimal glands (Panda sign) or in right paratracheal & left hilar area (lambda sign).

684 In BAL fluid, CD4 / CD8 ratio more than which of the following is strongly supportive of sarcoidosis ?

Harrison's 18th Ed. 2811

- A. > 0.5
- B. > 1.5
- C. > 2.5
- D. > 3.5

In BAL fluid, CD4/CD8 ratio of > 3.5 is strongly supportive of sarcoidosis.

685 In sarcoidosis, bronchoalveolar lavage typically shows an increased proportion of which of the following ?

Harrison's 16th Ed. 2022

- A. CD4+T lymphocytes
- B. Alveolar macrophages
- C. Neutrophils
- D. Eosinophils

BAL typically shows an increased proportion of activated TH1 subset of CD4+T lymphocytes. Remaining cells are mostly alveolar macrophages. In significant fibrosis, a few neutrophils are also found. Eosinophils are rare. In normal individuals, lymphocytes represent <20% of the cell population.

686 In Kveim-Siltzbach skin test, source of intradermal injection sarcoidosis extract is from ?

Harrison's 18th Ed. 2811

- A. Liver
- B. Lung
- C. Spleen
- D. Lymph node

In Kveim-Siltzbach skin test, the intradermal injection of a heat-treated suspension of a sarcoidosis extract is from spleen of a known sarcoidosis patient.

687 In Kveim-Siltzbach test, papule that develops at the site of injection is biopsied how many weeks later ?

N Engl J Med 2007;357:2153-65

- A. 1 week
- B. 2 weeks
- C. 3 weeks
- D. 4 weeks

Kveim-Siltzbach test has been used for the diagnosis of sarcoidosis. It is performed by injecting homogenate of human sarcoid tissue extract intradermally. The papule that develops at the site of injection is biopsied 4 weeks later.

- 688 **Chronic sarcoidosis is likely if the acute form does not resolve within ?**
Harrison's 18th Ed. 2811
- A First 2 - 5 months
 - B. First 6 - 12 months
 - C. First 12 - 18 months
 - D. First 2 - 5 years

Chronic sarcoidosis is likely if acute form does not resolve within first 2 - 5 years.

- 689 **Risk factor at presentation for chronic sarcoidosis is ?**
Harrison's 18th Ed. 2811
- A Lupus pernio
 - B. Bone cysts
 - C. Renal calculi due to hypercalciuria
 - D. All of the above

Chronic sarcoidosis can be identified by risk factors at presentation like fibrosis on CxR, lupus pernio, bone cysts, cardiac or neurologic disease & presence of renal calculi due to hypercalciuria.

- 690 **Dosage of glucocorticoids is higher for ?**
Harrison's 18th Ed. 2812
- A Pulmonary sarcoidosis
 - B. Neurosarcoidosis
 - C. Cutaneous sarcoidosis
 - D. Cardiac sarcoidosis

Dosage of glucocorticoids is higher for neurosarcoidosis & lower for cutaneous disease.

- 691 **For the treatment of hypercalcemia in sarcoidosis, which of the following drugs is effective ?**
N Engl J Med 2007;357:2153-65
- A Azathioprine
 - B. Hydroxychloroquine
 - C. Thalidomide
 - D. Methotrexate

Hydroxychloroquine is used for hypercalcemia, skin disease & neurologic involvement. Thalidomide & Methotrexate are recommended in Lupus pernio. Azathioprine is recommended in sarcoidosis with intracerebral involvement.

- 692 **Bilateral hilar adenopathy is seen in ?**
Harrison's 16th Ed. 2023
- A Sarcoidosis
 - B. Lymphoma
 - C. Brucellosis
 - D. All of the above

Bilateral hilar adenopathy is seen in sarcoidosis, lymphoma, tuberculosis, coccidioidomycosis, brucellosis, and bronchogenic carcinoma.

- 693 **Usually, after glucocorticoids, which of the following is the most preferred drug in the treatment of sarcoidosis ?**
Harrison's 18th Ed. 2812
- A Methotrexate
 - B. Hydroxychloroquine
 - C. Azothioprine
 - D. Cyclophosphamide

Therapy of choice for sarcoidosis is glucocorticoids. Methotrexate is the second-line medication. Other drugs in refractory cases include indomethacin, oxyphenbutazone, chloroquine, hydroxychloroquine, thalidomide, infliximab, etanercept, pentoxifylline, tacrolimus, p-aminobenzoate, allopurinol, levamisole, azothioprine, and cyclophosphamide.

- 694 **Sarcoidosis clears spontaneously in about what percentage of patients ?**
Harrison's 16th Ed. 2023
- A 10 %
 - B. 25 %
 - C. 50 %
 - D. 75 %

Sarcoidosis clears spontaneously in ~50% of patients. As permanent organ derangements often do not improve with glucocorticoid treatment, decision making on therapy depends on the extent and activity of the inflammatory process in lung, eye, heart, and CNS.

- 695 **Prednisone therapy in sarcoidosis is usually slowly tapered over how many months ?**
Harrison's 16th Ed. 2023
- A 1 to 2 months
 - B. 2 to 3 months
 - C. 3 to 4 months
 - D. 4 to 6 months

Usual therapy for sarcoidosis is prednisone, 1 mg/kg, for 4 to 6 weeks, followed by a slow taper over 2 to 3 months.

- 696 **Glucocorticoids in sarcoidosis are most effective through which of the following routes of administration ?**
Harrison's 16th Ed. 2023
- A Oral
 - B. Intravenous
 - C. Intramuscular
 - D. Inhaled

High-dose bolus intravenous glucocorticoids in sarcoidosis are not as effective as oral therapy. There is no evidence that inhaled glucocorticoids are efficacious.

Chapter 262. Deep Venous Thrombosis and Pulmonary Thromboembolism

- 697 **Wells diagnostic scoring system is used for ?**
Harrison's 16th Ed. 1561
- A ILD
 - B. COPD
 - C. Pulmonary embolism
 - D. Cystic fibrosis

Wells Diagnostic Scoring System is a semi-quantitative clinical scoring system for suspected pulmonary embolism (PE).

- 698 **Wells Scoring System has a maximum of ?**
Harrison's 16th Ed. 1561 Table 244-1
- A 8.5 points
 - B. 10.5 points
 - C. 12.5 points
 - D. 15.5 points

The Wells Scoring System has a maximum of 12.5 points. If the score is <= 4 points, the likelihood of PE is only 8%.

- 699 **Frequency of occurrence of DVT is how many times more than PE ?**
Harrison's 17th Ed. 1651
- A 2

- B. 3
- C. 4
- D. 5

Venous thromboembolism (VTE) includes deep venous thrombosis (DVT) & pulmonary embolism (PE). DVT occurs about 3 times more often than PE.

700 Which of the following is false about postphlebotic syndrome ?

Harrison's 18th Ed. 2170

- A. Early adverse effect of DVT
- B. Caused by permanent damage to venous valves of leg
- C. Skin ulceration on medial malleolus of leg
- D. No effective medical therapy

Major adverse outcome of DVT alone, without PE, is postphlebotic syndrome, which occurs in more than half of DVT cases. It is a late adverse effect of DVT. It is also known as postthrombotic syndrome or chronic venous insufficiency.

701 Which of the following medical conditions contribute to the likelihood of VTE ?

Harrison's 18th Ed. 2170

- A. Antiphospholipid antibody syndrome
- B. Systemic arterial hypertension
- C. Chronic obstructive pulmonary disease
- D. All of the above

Acquired predispositions to VTE include long-haul air travel, obesity, cigarette smoking, oral contraceptives, pregnancy, postmenopausal hormone replacement, surgery, trauma. Medical conditions include APLA syndrome, cancer, systemic arterial hypertension & COPD.

702 Which of the following about pregnancy & DVT is false ?

- A. DVT occurs in ~1 in 2000 pregnancies
- B. DVT more common in left than right leg
- C. ~25% pregnancy with DVT carry factor V Leiden allele
- D. None of the above

703 Genetic mutations associated with DVT in pregnancy include ?

- A. Factor V Leiden mutation
- B. Prothrombin G20210A mutation
- C. Methylenetetrahydrofolate reductase C677T mutation
- D. All of the above

Autosomal dominant genetic mutations that contribute to the likelihood of VTE are factor V Leiden and the prothrombin gene mutations.

704 In a case of pulmonary embolism, which of the following is false ?

Harrison's 18th Ed. 2171

- A. Increased pulmonary vascular resistance
- B. Impaired gas exchange
- C. Alveolar hypoventilation
- D. Increased airway resistance

Effects of pulmonary embolism are : Increased pulmonary vascular resistance, impaired gas exchange, alveolar hyperventilation, increased airway resistance & decreased pulmonary compliance.

705 Which of the following is the most common source of paradoxical embolism ?

Harrison's 18th Ed. 2171

- A. Pelvic vein thrombosis
- B. Proximal leg deep venous thrombosis

- C. Isolated calf vein thrombi
- D. Any of the above

50% of patients with pelvic vein thrombosis or proximal leg deep venous thrombosis (DVT) have asymptomatic pulmonary thromboembolism (PTE). Isolated calf vein thrombi pose a lower risk of PE but they are the most common source of paradoxical embolism.

706 Eponym "The Great Masquerader" is used for ?

Harrison's 18th Ed. 2171

- A. Deep venous thrombosis (DVT)
- B. Pulmonary embolism (PE)
- C. Venous thromboembolism (VTE)
- D. All of the above

Apart from PE, term masquerader has been used for acute appendicitis & pheochromocytoma.

707 Which of the following is likely in massive DVT ?

Harrison's 18th Ed. 2171

- A. Sudden, severe calf discomfort
- B. Severe thigh swelling
- C. Diffusely edematous leg
- D. Any of the above

Sudden, severe calf discomfort suggests a ruptured Baker's cyst. Severe thigh swelling & marked tenderness in inguinal area & common femoral vein occurs in massive DVT. If leg is diffusely edematous, DVT is unlikely, rather acute exacerbation of venous insufficiency due to postphlebotic syndrome is likely.

708 Which of the following suggests a small pulmonary embolism ?

Harrison's 18th Ed. 2172

- A. Dyspnea
- B. Pleuritic pain
- C. Syncope
- D. Hypotension

709 Which of the following suggests a massive pulmonary embolism ?

Harrison's 18th Ed. 2172

- A. Cough
- B. Pleuritic pain
- C. Dyspnea
- D. Hemoptysis

Dyspnea is the most frequent symptom of PE, and tachypnea is its most frequent sign. Dyspnea, syncope, hypotension or cyanosis indicates a massive PE. Pleuritic pain, cough or hemoptysis suggests a small embolism located distally near the pleura.

710 Levels of D-dimer increase in ?

Harrison's 18th Ed. 2172

- A. Myocardial infarction
- B. Sepsis
- C. Second or third trimester of pregnancy
- D. All of the above

Levels of D-dimer increase in myocardial infarction, pneumonia, sepsis, cancer, postoperative state, and second or third trimester of pregnancy.

711 ECG change in pulmonary embolism include ?

Harrison's 18th Ed. 2172

- A. T wave inversion in V₁₋₄
- B. New onset atrial fibrillation

- C. $S_1Q_3T_3$ pattern
D. All of the above

Classic ECG abnormalities in PE include sinus tachycardia, new-onset atrial fibrillation or flutter & an S wave in lead I, a Q wave in lead III & an inverted T wave in lead III. QRS axis is $>90^\circ$.

712 Most frequent ECG finding in pulmonary embolism is ?

Harrison's 18th Ed. 2172

- A. New-onset atrial fibrillation
B. $S_1Q_3T_3$ pattern
C. QRS axis greater than 90°
D. T-wave inversion in leads V_1 to V_4

In PE, T-wave inversion in leads V_1 to V_4 is the most frequent change (right ventricular strain).

713 Which of the following is a feature of pulmonary embolism on chest X-Ray ?

Harrison's 18th Ed. 2173

- A. Westermark's sign
B. Hampton's hump
C. Palla's sign
D. All of the above

714 Palla's sign refers to ?

Harrison's 18th Ed. 2173

- A. Focal oligemia
B. Peripheral wedged-shaped density above diaphragm
C. Enlarged right descending pulmonary artery
D. Enlarged left descending pulmonary artery

715 Westermark's sign refers to ?

Harrison's 18th Ed. 2173

- A. Focal oligemia
B. Peripheral wedged-shaped density above diaphragm
C. Enlarged right descending pulmonary artery
D. Enlarged left descending pulmonary artery

716 Hampton's hump refers to ?

Harrison's 18th Ed. 2173

- A. Focal oligemia
B. Peripheral wedged-shaped density above diaphragm
C. Enlarged right descending pulmonary artery
D. Enlarged left descending pulmonary artery

In a dyspneic patient, a normal or near-normal chest x-ray suggests PE. Other abnormalities include focal oligemia (Westermark's sign), a peripheral wedged-shaped density above the diaphragm (Hampton's hump), or an enlarged right descending pulmonary artery (Palla's sign).

717 Pulmonary perfusion scan that has a high probability for PE should have how many segmental perfusion defects in the presence of normal ventilation scan ?

Harrison's 18th Ed. 2173

- A. One or more
B. Two or more
C. Three or more
D. Four or more

A high probability pulmonary perfusion scan for PE is defined as having two or more segmental perfusion defects in the presence of normal ventilation scan.

718 Echocardiography is the least useful diagnostic tool for ?

Harrison's 17th Ed. 1654

- A. Acute myocardial infarction
B. Pulmonary embolism
C. Pericardial tamponade
D. Aortic dissection

Echocardiography is not a reliable diagnostic imaging tool for acute PE because most patients with PE have normal echocardiograms.

719 In echocardiography, McConnell's sign is specific for which of the following ?

Harrison's 18th Ed. 2174

- A. HOCM
B. Pulmonary embolism
C. Acute rheumatic fever
D. Infective endocarditis

Echocardiographic McConnell's sign refers to right ventricular free wall hypokinesis with normal right ventricular apical motion and is specific for PE.

720 Which of the following is the principal imaging test for the diagnosis of PE ?

Harrison's 18th Ed. 2173

- A. Lung Scanning
B. Chest x-ray
C. Chest CT
D. Echocardiography

Computed tomography of chest with intravenous contrast is the principal imaging test for diagnosis of PE. Multidetector-row spiral CT scanners can image small peripheral emboli. Sixth-order branches can be visualized with resolution superior to that of conventional invasive contrast pulmonary angiography.

721 Which of the following is false ?

Harrison's 18th Ed. 2174

- A. Normal or nearly normal chest x-ray often occurs in PE
B. Normal venous ultrasound does not exclude PE
C. Lung scanning is the second-line diagnostic test for PE
D. None of the above

PE is unlikely in normal/nearly normal lung scan. Echocardiography is not reliable diagnostic tool for acute PE

722 Definitive diagnostic test for pulmonary embolism is ?

Harrison's 16th Ed. 1563

- A. V/Q scan
B. MR Angiography
C. CT Chest
D. Selective pulmonary angiography

Selective pulmonary angiography demonstrating intraluminal filling defect in more than one projection is the most specific examination available for establishing the definitive diagnosis of PE and can detect emboli as small as 1 to 2 mm. Although, chest CT with contrast has replaced invasive pulmonary angiography as a diagnostic test, invasive catheter-based diagnostic testing is reserved for patients with technically unsatisfactory chest CTs and those in whom an interventional procedure such as catheter-directed thrombolysis or embolectomy is planned.

723 Primary therapy of PE is ?

Harrison's 18th Ed. 2174

- A. Anticoagulation with heparin
B. Anticoagulation with warfarin
C. Thrombolysis

- D. Placement of inferior vena caval filter

Primary therapy consists of clot dissolution with thrombolysis or removal of PE by embolectomy. Anticoagulation with heparin and warfarin or placement of an inferior vena caval filter constitutes secondary prevention of recurrent PE.

724 In pulmonary embolism, which of the following identify high-risk patients ?

Harrison's 18th Ed. 2174

- A. Hemodynamic instability
- B. Right ventricular dysfunction
- C. Elevation of troponin level
- D. All of the above

Hemodynamic instability, right ventricular dysfunction, or elevation of the troponin level due to right ventricular microinfarction identify high-risk PE. RV enlargement on chest CT indicates a 5x increased likelihood of death within next 30 days compared with PE patients with normal RV size on chest CT.

725 In PE, which of the following is the most widely used approach to risk stratification ?

Harrison's 18th Ed. 2174

- A. Elevation of troponin level
- B. S₁Q₃T₃ pattern in ECG
- C. Detection of RV hypokinesis by echocardiography
- D. Increased levels of D-dimer

In PE, detection of RV hypokinesis on echocardiography is most widely used for risk stratification.

726 Heparin should be overlapped with oral anticoagulation for at least how many days ?

Harrison's 18th Ed. 2175

- A. 2 to 3 days
- B. 3 to 4 days
- C. 4 to 5 days
- D. 5 to 6 days

Warfarin requires 5-7 days to achieve a therapeutic effect. During that period, the parenteral and oral agents are overlapped.

727 In massive pulmonary embolism, immediately effective anticoagulation is initiated with ?

Harrison's 18th Ed. 2175

- A. Unfractionated heparin (UFH)
- B. Low molecular weight heparin (LMWH)
- C. Fondaparinux
- D. Any of the above

In massive PE, immediately effective anticoagulation is initiated with a parenteral drug - UFH, LMWH (Enoxaparin, Tinzaparin), or fondaparinux.

728 A typical initial intravenous bolus of unfractionated heparin in PE is ?

Harrison's 18th Ed. 2175

- A. 60 U / kg
- B. 80 U / kg
- C. 100 U / kg
- D. 120 U / kg

UFH is dosed to achieve a target activated partial thromboplastin time (aPTT) that is 2 - 3 times the upper limit of laboratory normal. This is usually equivalent to an aPTT of 60 - 80 seconds. For UFH, a typical initial intravenous bolus is 80 U/kg, followed by an initial infusion rate of 18/kg per hour.

729 Which of the following is a direct thrombin inhibitor ?

Harrison's 18th Ed. 2175

- A. Argatroban
- B. Lepirudin
- C. Bivalirudin
- D. All of the above

Direct thrombin inhibitors are argatroban, lepirudin, or bivalirudin and should be used in patients with proven or suspected heparin-induced thrombocytopenia. Dabigatran is a direct thrombin inhibitor.

730 What is the dose of Fondaparinux in patients weighing between 50 - 100 kg ?

Harrison's 18th Ed. 2175

- A. 2.5 mg
- B. 5 mg
- C. 7.5 mg
- D. 10 mg.

Fondaparinux is an anti-Xa pentasaccharide. It is administered by once-daily subcutaneous injection. Patients weighing <50 kg receive 5 mg, 50-100 kg patients receive 7.5 mg, and patients weighing >100 kg receive 10 mg. 2.5 mg of Fondaparinux is used to prevent VTE.

731 Warfarin acts by preventing carboxylation activation of which coagulation factor ?

Harrison's 18th Ed. 2175

- A. II
- B. VII
- C. X
- D. All of the above

Warfarin is a vitamin K antagonist that prevents carboxylation activation of coagulation factors II, VII, IX, and X.

732 Which of the following affect warfarin metabolism ?

Harrison's 18th Ed. 2175

- A. Drug-drug and drug-food interactions
- B. Age, sex, weight
- C. Concomitant drugs
- D. All of the above

733 "Bridging" with a parenteral anticoagulant is required when which of the following is used ?

Harrison's 18th Ed. 2176

- A. Dabigatran
- B. Warfarin
- C. Rivaroxaban
- D. All of the above

Rivaroxaban is a factor Xa inhibitor, and dabigatran is a direct thrombin inhibitor. Because of these drugs' rapid onset of action & relatively short half-life compared with warfarin, "bridging" with a parenteral anticoagulant is not required.

734 Antidote for bleeding from fondaparinux is ?

Harrison's 18th Ed. 2176

- A. Protamine sulfate
- B. Vitamin K
- C. Recombinant factor VIIa
- D. None of the above

There is no specific antidote for bleeding from fondaparinux or direct thrombin inhibitors.

735 Catastrophic bleeding associated with warfarin administration is best treated by ?

Harrison's 18th Ed. 2176

- A. Fresh-frozen plasma
- B. Recombinant factor VIIa therapy (rFVIIa)
- C. Vitamin K
- D. All of the above

For life-threatening or intracranial hemorrhage due to heparin or LMWH, protamine sulfate can be administered. Major bleeding from warfarin is best managed with prothrombin complex concentrate. With non-life threatening bleeding, fresh-frozen plasma can be used. Recombinant human coagulation factor VIIa (rFVIIa) is used to manage catastrophic bleeding from warfarin. For minor bleeding or to manage an excessively high INR in the absence of bleeding, oral vitamin K may be administered.

736 Most common nonbleeding side effect of warfarin is ?

Harrison's 17th Ed. 1656

- A. Alopecia
- B. Skin necrosis
- C. Seizure
- D. Osteoporosis

Most common nonbleeding side effect of warfarin is alopecia. Warfarin-induced skin necrosis is rare.

737 Warfarin embryopathy occurs with warfarin exposure during ?

Harrison's 18th Ed. 2176

- A. Second to sixth weeks of gestation
- B. Sixth to twelfth weeks of gestation
- C. Twelfth to sixteen weeks of gestation
- D. Twenty to twenty four weeks of gestation

Warfarin embryopathy is most common with exposure during 6th to 12th weeks of gestation. Warfarin therapy is contraindicated in first trimester due to its association with fetal chondrodysplasia punctata. In the second and third trimesters, warfarin may cause fetal optic atrophy and mental retardation.

738 Warfarin can be administered safely during ?

Harrison's 18th Ed. 2176

- A. Second trimester of pregnancy
- B. Postpartum period
- C. Breast feeding
- D. All of the above

Warfarin is safe during second trimester, postpartum and breast feeding period.

739 Duration of anticoagulation for PE following surgery or trauma is ?

Harrison's 18th Ed. 2176

- A. 3 - 6 months
- B. 6 - 12 months
- C. 12 - 18 months
- D. Indefinite

Duration of anticoagulation for PE following surgery or trauma is 3 - 6 months.

740 Duration of anticoagulation for PE with moderate or high levels of anticardiolipin antibodies is ?

Harrison's 18th Ed. 2176

- A. 3 - 6 months
- B. 6 - 12 months
- C. 12 - 18 months
- D. Indefinite

Duration of anticoagulation for PE with moderate or high levels of anticardiolipin antibodies is indefinite, even if initial VTE was provoked by trauma or surgery.

741 Indefinite-duration anticoagulation is recommended for ?

Harrison's 18th Ed. 2176

- A. Patients with high levels of anticardiolipin antibodies
- B. Patients with idiopathic VTE
- C. Patients with cancer and VTE
- D. All of the above

742 First-line inotropic agent for treatment of PE-related shock is ?

Harrison's 18th Ed. 2176

- A. Dopamine / dobutamine
- B. Phenylephrine
- C. Vasopressin
- D. Norepinephrine

Dopamine and dobutamine are first-line inotropic agents for treatment of PE-related shock.

743 Successful fibrinolytic therapy in PE leads to ?

Harrison's 18th Ed. 2176

- A. Rapidly reversal of right heart failure
- B. Lowers rate of death
- C. Prevention of recurrent PE
- D. All of the above

Successful fibrinolytic therapy in PE rapidly reverses right heart failure and leads to a lower rate of death and recurrent PE.

744 The preferred fibrinolytic regimen in PE is ?

Harrison's 18th Ed. 2176

- A. Recombinant tissue plasminogen activator (tPA)
- B. Streptokinase
- C. Urokinase
- D. Alteplase

Preferred fibrinolytic regimen is 100 mg of tPA administered as a continuous peripheral intravenous infusion over 2 hours.

745 PE patients respond to fibrinolysis for up to how many days after the PE has occurred ?

Harrison's 18th Ed. 2176

- A. 1 day
- B. 3 days
- C. 7 days
- D. 14 days

PE patients respond to fibrinolysis for up to 14 days after the PE has occurred.

746 Which of the following prevents postphlebotic syndrome ?

Harrison's 18th Ed. 2177

- A. Vascular compression stockings
- B. Aspirin
- C. Warfarin
- D. Clopidogrel

Only therapy to prevent postphlebotic syndrome is daily use of below-knee 30 - 40 mmHg vascular compression stockings.

747 All are true for pulmonary embolism except ?

Harrison's 16th Ed. 1562

- A. Plasma D-dimer ELISA assay has high (-) predictive value
- B. ABG lacks diagnostic utility

- C. Westermarck's sign in chest X-Ray is focal oligemia
- D. Palla's sign is enlarged (L) descending pulmonary artery

Quantitative ELISA plasma D-dimer level is elevated (>500 ng/mL) in more than 90% of patients with PE, reflecting plasmin's breakdown of fibrin and indicating endogenous thrombolysis. D-dimer assay is not specific and levels increase in patients with MI, sepsis etc. Plasma D-dimer ELISA has a high negative predictive value (99.6%) and can be used to help exclude PE. It has a sensitivity of 96.4%. Arterial blood gases lack diagnostic utility for PE.

Chapter 263. Disorders of the Pleura and Mediastinum

- 748 In healthy adults, pleural space contains how much of pleural fluid ?**

Cleveland Clinic Journal Of Medicine 2008;75:303

- A. 5 to 10 mL
- B. 25 to 50 mL
- C. 50 to 100 mL
- D. 100 to 150 mL

In healthy adults, pleural space contains ~ 5 to 10 mL of pleural fluid (0.1 mg/kg body weight).

- 749 Which of the following is not related to pleural effusion ?**

Cleveland Clinic Journal Of Medicine 2008;75:303

- A. Skodaic resonance
- B. Calots triangle
- C. Grocco triangle
- D. Garland triangle

Skodaic resonance (area of hyperresonance above a pleural effusion), Succussion splash (splashing sound produced by violently shaking patients with hydropneumothorax), Grocco triangle (right-angle triangle of dullness found over posterior region of chest opposite a large pleural effusion), Garland triangle (small area of resonance next to spine in patients with large unilateral pleural effusions).

- 750 Contralateral tracheal or mediastinal shift occurs when the size of pleural effusion is ?**

Cleveland Clinic Journal Of Medicine 2008;75:303

- A. 300 - 500 mL
- B. 500 - 750 mL
- C. 750 - 1000 mL
- D. > 1,500 mL

Physical findings are normal if <300 mL of fluid is present. Large effusions (>1500 mL) is associated with significant asymmetry of chest expansion, contralateral tracheal or mediastinal shift and bulging of intercostal spaces.

- 751 What quantity of pleural fluid must be present to be detected by physical examination ?**

Cleveland Clinic Journal Of Medicine 2008;75:303

- A. 100 mL
- B. 150 mL
- C. 350 mL
- D. 500 mL

At least 500 mL of fluid must be present to be detected an effusion by physical examination.

- 752 Which of the following statements is false ?**

Harrison's 18th Ed. 2178

- A. Normally, fluid enters pleural space from capillaries in parietal pleura

- B. Normally, fluid is removed via lymphatics situated in parietal pleura
- C. Fluid can also enter pleural space from peritoneal cavity
- D. Lymphatics have the capacity to absorb 2 times more fluid than is normally formed in pleural spaces

Lymphatics have a capacity to absorb 20 times more fluid than is normally formed.

- 753 Which of the following is true for exudative pleural effusions ?**

Harrison's 18th Ed. 2178

- A. Pleural fluid protein / serum protein >0.5
- B. Pleural fluid LDH / serum LDH >0.6
- C. Pleural fluid LDH > two-thirds normal upper limit for serum
- D. All of the above

- 754 Which of the following is true for transudative pleural effusions ?**

Harrison's 18th Ed. 2178

- A. Pleural fluid protein / serum protein >0.5
- B. Pleural fluid LDH / serum LDH >0.6
- C. Pleural fluid LDH > two-thirds normal upper limit for serum
- D. None of the above

Light's criteria - Out of the following, exudative pleural effusions meet at least one, whereas transudative pleural effusions meet none. Pleural fluid protein/serum protein >0.5, pleural fluid LDH/serum LDH >0.6 and pleural fluid LDH more than two-thirds normal upper limit for serum. Still, if clinically transudative effusion is strongly suspected, difference between albumin levels in serum and pleural fluid is estimated. If this difference is >3.1 g/dL, pleural effusion is transudative.

- 755 Most common cause of pleural effusion is ?**

Harrison's 18th Ed. 2178

- A. Left ventricular failure
- B. Bacterial pneumonia
- C. Cirrhosis liver
- D. Viral infection

Most common cause of pleural effusion is LVF. Isolated right-sided pleural effusions are more common than left-sided effusions in heart failure.

- 756 Which of the following test is virtually diagnostic of pleural effusion secondary to congestive heart failure ?**

Harrison's 18th Ed. 2179

- A. Pleural fluid LDH
- B. Pleural fluid N-terminal pro-brain natriuretic peptide
- C. Pleural fluid sodium
- D. Pleural fluid osmolality

Pleural fluid NT-proBNP >1500 pg/mL is virtually diagnostic of an effusion secondary to CHF.

- 757 Which of the following is false for 'Hepatic Hydrothorax' ?**

Harrison's 18th Ed. 2179

- A. Occur in ~5% of patients with cirrhosis & ascites
- B. Due to direct movement of peritoneal fluid through small holes in diaphragm into pleural space
- C. Effusion is usually left-sided
- D. Transjugular intrahepatic portal systemic shunt helpful

Hepatic Hydrothorax is usually "right-sided".

- 758 Parapneumonic effusions are associated with ?**

Harrison's 18th Ed. 2179

- A. Bacterial pneumonia

- B. Lung abscess
- C. Bronchiectasis
- D. All of the above

Parapneumonic effusions are associated with bacterial pneumonia, lung abscess, or bronchiectasis. Grossly purulent effusion is termed Empyema.

759 Which of the following is the likely pathogen in pneumonia presenting with a subacute illness, weight loss, brisk leukocytosis and possibility of aspiration ?

Harrison's 18th Ed. 2179

- A. Bacterial infection
- B. Anaerobic infection
- C. Fungal infection
- D. Viral infection

Patients with "anaerobic infections" present with a subacute illness, weight loss, brisk leukocytosis, mild anemia, & predisposition for aspiration.

760 Therapeutic thoracentesis is indicated if pleural free fluid separates lung from chest wall by ?

Harrison's 18th Ed. 2179

- A. > 5 mm
- B. > 10 mm
- C. > 15 mm
- D. > 20 mm

If pleural free fluid separates lung from the chest wall by >10 mm, a therapeutic thoracentesis should be performed.

761 Factors indicating the likely need for a procedure more invasive than a thoracentesis are all except ?

Harrison's 18th Ed. 2179

- A. Loculated pleural fluid
- B. Pleural fluid pH < 7.40
- C. Pleural fluid glucose <60 mg/dL
- D. Positive Gram stain or culture of pleural fluid

Factors indicating the likely need for a procedure more invasive than a thoracentesis include loculated pleural fluid, pleural fluid pH < 7.20, pleural fluid glucose <60 mg/dL, (+) Gram stain or culture, gross pus in pleural space

762 Which out of the following is the commonest cause of malignant pleural effusion ?

Harrison's 18th Ed. 2179

- A. Hepatoma
- B. Ca. Pancreas
- C. Ca. Thyroid
- D. Lymphoma

763 Which out of the following is the commonest cause of malignant pleural effusion ?

Harrison's 18th Ed. 2179

- A. Hepatoma
- B. Leukemia
- C. Mesotheliomas
- D. Ca. Breast

Lung carcinoma, breast carcinoma & lymphoma are the cause of ~75% of all malignant pleural effusions.

764 The only symptom that can be attributed to the malignant pleural effusion itself is ?

Harrison's 18th Ed. 2179

- A. Dyspnea
- B. Pain
- C. Cough
- D. Hemoptysis

Only symptom that can be attributed to pleural effusion itself is dyspnea. Dyspnea is frequently out of proportion to the size of pleural effusion.

765 Which of the following about malignant pleural effusion is false ?

Harrison's 18th Ed. 2179

- A. To be treated symptomatically
- B. Indicates disseminated disease
- C. Most malignancies associated with PE are not curable
- D. None of the above

Patients with malignant pleural effusion are treated symptomatically as presence of effusion indicates disseminated disease & most malignancies associated with pleural effusion are not curable with chemotherapy.

766 Most malignant mesotheliomas are related to exposure to ?

Harrison's 18th Ed. 2179

- A. Silica
- B. Asbestos
- C. Benzene
- D. Carbon

Malignant mesotheliomas are primary tumors that arise from the mesothelial cells that line the pleural cavities. Most are related to asbestos exposure.

767 Chest radiograph of patients with mesothelioma reveals ?

Harrison's 18th Ed. 2179

- A. Pleural effusion
- B. Generalized pleural thickening
- C. Shrunken hemithorax
- D. All of the above

Chest radiograph in patients with mesothelioma reveals a pleural effusion, generalized pleural thickening, and a shrunken hemithorax.

768 Shortness of breath in mesothelioma should be treated with ?

Harrison's 18th Ed. 2179

- A. Bronchodilators
- B. Glucocorticoids
- C. Opiates
- D. ACE inhibitors

Shortness of breath in mesothelioma is treated with oxygen and/or opiates.

769 The diagnosis most commonly overlooked in differential diagnosis of an undiagnosed pleural effusion is ?

Harrison's 18th Ed. 2179

- A. Pulmonary embolism
- B. Left ventricular failure
- C. Malignancy
- D. AIDS

Diagnosis most commonly overlooked in differential diagnosis of an undiagnosed pleural effusion is pulmonary embolism.

770 Which is the most common symptom in cases of pleural effusion secondary to pulmonary embolization ?

Harrison's 18th Ed. 2179

- A. Dyspnea
- B. Pain
- C. Cough
- D. Hemoptysis

Dyspnea is the most common symptom in with pleural effusion due to PE.

771 In pleural effusion secondary to pulmonary embolization, if pleural effusion increases in size after anticoagulation, the possibility is ?

Harrison's 18th Ed. 2179

- A. Recurrent emboli
- B. Hemothorax
- C. Pleural infection
- D. All of the above

If pleural effusion secondary to PE increases in size after anticoagulation, probability is of recurrent emboli or a hemothorax or a pleural infection.

772 Tuberculous pleural effusions are due to ?

Harrison's 18th Ed. 2179

- A. Hematogenous spread of tubercular bacilli
- B. Contiguous spread of tubercular bacilli
- C. Hypersensitivity reaction to tuberculous protein in pleural space
- D. All of the above

Tuberculous pleural effusions are due to a hypersensitivity reaction to tuberculous protein in pleural space.

773 Which of the following is false about tuberculous pleural effusion ?

Harrison's 18th Ed. 2179

- A. Contains predominantly small lymphocytes
- B. Adenosine deaminase level > 40 IU/L
- C. Interferon γ level >140 pg/mL
- D. Recommended treatment of pleural & pulmonary tuberculosis is not identical

Tuberculous pleural fluid is an exudate with predominantly small lymphocytes. TB markers in pleural fluid like ADA is > 40 IU/L, interferon γ is > 140 pg/mL, or positive PCR for tuberculous DNA. The recommended treatment of pleural and pulmonary tuberculosis is "identical".

774 Pleural effusion that produces no shift of mediastinal structures to opposite side is suggestive of ?

Harrison's 16th Ed. 1523

- A. Tuberculosis
- B. Mesothelioma
- C. Pulmonary adenocarcinoma
- D. Metastasis to pleura

775 Which of the following is false about AIDS & pleural effusions ?

Harrison's 17th Ed. 1659

- A. Pleural effusions are uncommon
- B. Most common cause is Kaposi's sarcoma
- C. Pleural effusions very uncommon with P. carinii infection
- D. None of the above

Pleural effusions are uncommon in AIDS patients. The most common cause is Kaposi's sarcoma. Other common causes are TB, cryptococcosis, and primary effusion lymphoma. Pleural effusions are very uncommon with Pneumocystis carinii infection.

776 The most common cause of chylothorax is ?

Harrison's 18th Ed. 2179 - 80

- A. Malignancy
- B. Trauma
- C. Developmental anomaly
- D. Necrotizing infection

Chylothorax occurs when thoracic duct is disrupted and chyle accumulates in pleural space. The most common cause of chylothorax is trauma.

777 Which of the following is characteristic of pleural fluid biochemical analysis in a case of chylothorax ?

Harrison's 18th Ed. 2180

- A. LDL > 120 mg/dL
- B. Triglyceride > 110 mg/dL
- C. HDL < 40 mg/dL
- D. Total cholesterol > 300 mg/dL

In chylothorax, thoracentesis reveals milky fluid and biochemical analysis reveals a triglyceride level of > 110 mg/dL.

778 The treatment of choice for most chylothoraces is ?

Harrison's 18th Ed. 2180

- A. Tube thoracostomy with chest tube drainage
- B. Pleurodesis
- C. Implantation of a pleuroperitoneal shunt
- D. Ligation of thoracic duct

Treatment of choice for most chylothoraces is insertion of a chest tube plus administration of octreotide. If these fail, a pleuroperitoneal shunt is placed unless patient has chylous ascites.

779 Hemothorax is diagnosed when hematocrit of pleural fluid is how much of the peripheral blood hematocrit ?

Harrison's 18th Ed. 2180

- A. > 25 %
- B. > 33 %
- C. > 50 %
- D. > 75 %

If hematocrit of bloody pleural fluid is >50% that of the peripheral blood, patient has a hemothorax.

780 Most hemothoraces are the result of ?

Harrison's 18th Ed. 2180

- A. Trauma
- B. Rupture of a blood vessel
- C. Tumor
- D. Tuberculosis

Most hemothoraces are due to trauma. Other causes include rupture of a blood vessel or tumor.

781 The treatment of choice for most hemothorax is ?

Harrison's 18th Ed. 2180

- A. Tube thoracostomy with chest tube drainage
- B. Pleurodesis
- C. Thoracotomy
- D. Blood transfusion

Most patients with hemothorax are treated with tube thoracostomy, which allows continuous quantification of bleeding. If pleural hemorrhage exceeds 200 mL/hour, thoracotomy is considered.

782 Which WBC predominates in drug-induced pleural effusion ?

Harrison's 18th Ed. 2181

- A. Neutrophil
- B. Lymphocyte
- C. Monocyte
- D. Eosinophil

Several drugs can cause pleural effusion. Associated fluid is usually eosinophilic.

783 Drug-induced pleural disease can be due to all except ?

Harrison's 18th Ed. 2180, Table 263-1

- A. Nitrofurantoin
- B. Dantrolene
- C. Chloroquine
- D. Methysergide

784 Drug-induced pleural disease can be due to all except ?

Harrison's 18th Ed. 2180, Table 263-1

- A. Cephalosporins
- B. Bromocriptine
- C. Procarbazine
- D. Amiodarone

Drug-induced Exudative pleural disease can be due to Nitrofurantoin, Dantrolene, Methysergide, Bromocriptine, Procarbazine, Amiodarone.

785 Pleural effusions that occur following coronary artery bypass surgery within the first weeks are which sided ?

Harrison's 18th Ed. 2180 - 81

- A. Right-sided
- B. Left-sided
- C. Bilateral
- D. Any of the above

Pleural effusions commonly occur within weeks following CABG surgery are left-sided & bloody, with large numbers of eosinophils & respond to therapeutic thoracenteses. Effusions occurring after first few weeks are left-sided & clear yellow with more of small lymphocytes & tend to recur.

786 Which of the following medical manipulations can cause pleural effusion ?

Harrison's 18th Ed. 2180, Table 263-1

- A. Endoscopic variceal sclerotherapy
- B. Radiation therapy
- C. Intra-vascular insertion of central lines
- D. All of the above

Medical manipulations that induce pleural effusions include abdominal surgery, endoscopic variceal sclerotherapy, radiation therapy, liver or lung transplantation, or intravascular insertion of central lines.

787 All of the following are features of "Pulmonary Lymphangiomyomatosis (LAM)" except ?

Harrison's 16th Ed. 1559

- A. Asthma
- B. Emphysema
- C. Recurrent pneumothorax
- D. Chylous pleural effusion

788 In "Pulmonary Lymphangiomyomatosis (LAM)", characteristic pathological lesion is ?

Harrison's 16th Ed. 1559

- A. Proliferation of lung lymphatic vessels
- B. Proliferation of atypical pulmonary interstitial smooth muscle
- C. Proliferation of surfactant producing alveolar cells
- D. All of the above

789 Which of the following treatment modalities have a beneficial role in "Pulmonary Lymphangiomyomatosis (LAM)" ?

Harrison's 16th Ed. 1559

- A. Oophorectomy
- B. Progesterone
- C. Tamoxifen
- D. All of the above

790 Which of the following about pneumothorax is false ?

Harrison's 18th Ed. 2181

- A. Spontaneous pneumothorax occurs without antecedent trauma to thorax
- B. Primary spontaneous pneumothorax occurs in the absence of underlying lung disease
- C. Secondary spontaneous pneumothorax occurs in presence of underlying lung disease
- D. In tension pneumothorax, pressure in pleural space is positive at the end of inspiration

In tension pneumothorax, pressure in pleural space is positive throughout the respiratory cycle.

791 Which of the following is false about primary spontaneous pneumothorax ?

Harrison's 18th Ed. 2181

- A. Usually due to rupture of apical pleural blebs
- B. Occur almost exclusively in smokers
- C. 50 % of patients with an initial primary spontaneous pneumothorax will have a recurrence
- D. None of the above

Primary spontaneous pneumothoraces are due to rupture of apical pleural blebs that lie within or immediately under the visceral pleura. They occur almost exclusively in smokers. Approximately one-half of patients with an initial primary spontaneous pneumothorax will have a recurrence.

792 Which of the following treatments for primary spontaneous pneumothorax surely prevents recurrences ?

Harrison's 18th Ed. 2181

- A. Simple aspiration
- B. Stapling of blebs
- C. Pleural abrasion
- D. All of the above

Initial recommended treatment for primary spontaneous pneumothorax is simple aspiration. If the lung does not expand or if patient has recurrent pneumothorax, thoracoscopy with stapling of blebs and pleural abrasion is indicated. Thoracoscopy or thoracotomy with pleural abrasion is ~100% successful in preventing recurrences.

793 Secondary spontaneous pneumothoraces are most frequently found in ?

Harrison's 18th Ed. 2181

- A. During mechanical ventilation or resuscitative efforts
- B. Asthma

- C. COPD
- D. Lung malignancy

Most secondary spontaneous pneumothoraces are due to COPD, but pneumothoraces have been reported with virtually every lung disease.

794 Patients with secondary spontaneous pneumothorax should be treated in the first instance with ?

Harrison's 18th Ed. 2181

- A. Tube thoracostomy
- B. Bleb resection
- C. Pleural abrasion
- D. Simple aspiration

Nearly all patients with secondary pneumothorax should be treated with tube thoracostomy.

795 Which of the following is a cause of iatrogenic pneumothorax ?

Harrison's 18th Ed. 2181

- A. Transthoracic needle aspiration
- B. Thoracentesis
- C. Insertion of central intravenous catheters
- D. All of the above

Leading causes of iatrogenic pneumothorax are transthoracic needle aspiration, thoracentesis and insertion of central intravenous catheters.

796 Tension pneumothorax is most frequently found in ?

Harrison's 18th Ed. 2181

- A. During mechanical ventilation/resuscitative efforts
- B. Asthma
- C. COPD
- D. Lung malignancy

Tension Pneumothorax usually occurs during mechanical ventilation or resuscitative efforts.

797 In treating 'Tension pneumothorax', a large-bore needle is inserted into pleural space through ?

Harrison's 18th Ed. 2181

- A. Second anterior intercostal space
- B. Third anterior intercostal space
- C. Fourth anterior intercostal space
- D. Fifth anterior intercostal space

Tension pneumothorax is a medical emergency. A large-bore needle is inserted into pleural space through 2nd anterior intercostal space. Needle is left in place until a thoracostomy tube can be inserted.

798 Mediastinum is separated into how many compartments ?

Harrison's 18th Ed. 2181

- A. 2
- B. 3
- C. 4
- D. 5

Mediastinum is the region between pleural sacs, separated in 3 compartments.

799 Thoracic duct is present in which compartment of mediastinum ?

Harrison's 18th Ed. 2181

- A. Anterior
- B. Middle
- C. Posterior
- D. None of the above

800 Azygos and hemiazygos veins are present in which compartment of mediastinum ?

Harrison's 18th Ed. 2181

- A. Anterior
- B. Middle
- C. Posterior
- D. None of the above

Anterior mediastinum extends from the sternum anteriorly to pericardium & brachiocephalic vessels posteriorly. It contains thymus gland, anterior mediastinal lymph nodes & internal mammary arteries & veins. Middle mediastinum lies between anterior & posterior mediastina & contains heart, ascending & transverse arches of aorta, venae cavae, brachiocephalic arteries & veins, phrenic nerves, trachea, main bronchi & their contiguous lymph nodes & pulmonary arteries & veins. Posterior mediastinum is bounded by pericardium & trachea anteriorly & vertebral column posteriorly. It contains descending thoracic aorta, esophagus, thoracic duct, azygos & hemiazygos veins & posterior group of mediastinal lymph nodes.

801 Lymphomas are most common lesion in which mediastinal compartment ?

Harrison's 18th Ed. 2181

- A. Anterior
- B. Middle
- C. Posterior
- D. Any of the above

802 Lymph node enlargement from metastases are most common lesion in which mediastinal compartment ?

Harrison's 18th Ed. 2181

- A. Anterior
- B. Middle
- C. Posterior
- D. Any of the above

The most common lesions in the anterior mediastinum are thymomas, lymphomas, teratomatous neoplasms, and thyroid masses. The most common masses in the middle mediastinum are vascular masses, lymph node enlargement from metastases or granulomatous disease, and pleuropulmonary and bronchogenic cysts. In the posterior mediastinum, neurogenic tumors, meningoceles, meningocele, gastroenteric cysts, and esophageal diverticula are commonly found.

803 Hamman's sign is characteristic of ?

Harrison's 18th Ed. 2182

- A. Pneumomediastinum
- B. Chronic mediastinitis
- C. Tension Pneumothorax
- D. Traumatic Pneumothorax

804 Hamman's sign is best elicited in which position ?

Harrison's 18th Ed. 2182

- A. Upright
- B. Supine
- C. Left lateral
- D. Prone

Physical examination in pneumomediastinum reveals subcutaneous emphysema in suprasternal notch & Hamman's sign, which is a crunching or clicking noise synchronous with heartbeat & best heard in left lateral decubitus position.

805 In pneumomediastinum, mediastinal air is absorbed faster if the patient is given ?

Harrison's 18th Ed. 2182

- A. High concentrations of oxygen
- B. CO₂ inhalation
- C. IV Hypertonic saline

- D. High doses of IV glucocorticoids

In pneumomediastinum, the mediastinal air will be absorbed faster if the patient inspires high concentrations of oxygen.

806 Word egophony comes from Greek "ego" which means ?

Cleveland Clinic Journal Of Medicine 2008;75:303

- A. Temper
B. Silence
C. Cat
D. Goat

Word egophony comes from Greek "ego" meaning goat. It describes change in pronounced sound of E to A. Mechanism in massive pleural effusions is upward displacement & compression or consolidation of lung at the top of effusion.

807 Which of the following is the cause of bilateral diaphragmatic paralysis ?

Harrison's 16th Ed. 1569

- A. Multiple sclerosis
B. Anterior horn disease
C. Muscular dystrophy
D. All of the above

Most common causes of bilateral diaphragmatic paralysis include high spinal cord injury, thoracic trauma (including cardiac surgery), multiple sclerosis, anterior horn disease, and muscular dystrophy.

808 Most patients with severe diaphragmatic weakness may present with ?

Harrison's 16th Ed. 1569

- A. Hypercapnic respiratory failure
B. Atelectasis
C. Pneumonia
D. All of the above

Most patients with severe diaphragmatic weakness present with hypercapnic respiratory failure, frequently complicated by cor pulmonale and right ventricular failure, atelectasis, and pneumonia.

809 Most common cause of unilateral paralysis of diaphragm is ?

Harrison's 16th Ed. 1569

- A. Thoracic trauma
B. High spinal cord injury
C. Nerve invasion from malignancy
D. Toxins

The most common cause of unilateral paralysis of the diaphragm is nerve invasion from malignancy, usually a bronchogenic carcinoma. If the patient does not have malignancy, then usually no cause for the paralysis is found.

810 "Sniff test" is used for the confirmation of ?

Harrison's 16th Ed. 1569

- A. Unilateral paralysis of diaphragm
B. Bilateral diaphragmatic paralysis
C. Nasal polyp
D. OSA

Diagnosis of unilateral paralysis of diaphragm is suggested by finding an elevated hemidiaphragm on the chest roentgenogram. Confirmation is best established with the "sniff test". When a patient is observed with fluoroscopy while sniffing, the paralyzed diaphragm will move paradoxically upward due to the negative intrathoracic pressure.

811 Which of the following is a pathophysiologic effect of severe kyphoscoliosis ?

Harrison's 16th Ed. 1569

- A. Restrictive lung disease

- B. Ventilation-perfusion imbalance
C. Cor pulmonale
D. All of the above

The major pathophysiologic effects of severe kyphoscoliosis are restrictive lung disease and ventilation-perfusion imbalances that result in chronic alveolar hypoventilation, hypoxic vasoconstriction, and eventually pulmonary arterial hypertension and cor pulmonale.

812 In kyphoscoliosis, at what angle of curvature, marked ventilatory abnormalities develop commonly ?

Harrison's 16th Ed. 1569

- A. > 60°
B. > 70°
C. > 80°
D. > 90°

The severity of the cardiopulmonary disease correlates roughly with the degree of scoliosis. If the angle of curvature is <60°, ventilatory impairment is rare, while if it is >90°, marked ventilatory abnormalities develop commonly.

813 Which of the following pectus excavatum is false ?

Harrison's 16th Ed. 1569

- A. Congenital condition
B. Respiratory symptoms are uncommon
C. Pulmonary function tests are nearly normal
D. None of the above

Pectus excavatum (Funnel chest) is a congenital condition. The lower portion of sternum is displaced posteriorly and anterior ribs are markedly bowed, which results in a depressed panel in anterior chest. Respiratory symptoms are uncommon, and pulmonary function tests are nearly normal.

814 Which of the following about pectus carinatum is false ?

Harrison's 16th Ed. 1569

- A. Structurally, it is the reverse of pectus excavatum
B. Associated with congenital atrial or ventricular septal defects
C. Severe prolonged childhood asthma
D. None of the above

Pectus carinatum (Pigeon breast) This condition is the reverse of pectus excavatum with the sternum protruding anteriorly. This deformity is associated with congenital atrial or ventricular septal defects and severe prolonged childhood asthma.

Chapter 264. Disorders of Ventilation

815 In health and at sea level, arterial level of carbon dioxide ($P_{a_{CO_2}}$) is maintained between ?

Harrison's 18th Ed. 2182

- A. 35 & 41 mmHg
B. 36 & 42 mmHg
C. 37 & 43 mmHg
D. 38 & 44 mmHg

In health the arterial level of carbon dioxide ($P_{a_{CO_2}}$) is maintained between 37 and 43 mmHg at sea level.

816 In the equation $P_{a_{CO_2}} = (k)(V_{CO_2})/V_A$, V_{CO_2} represents ?

Harrison's 18th Ed. 2182

- A. Carbon dioxide excretion
B. Carbon dioxide production
C. Carbon dioxide excess

D. Carbon dioxide retention

V_{CO_2} represents the carbon dioxide production, k is a constant and V_A is fresh gas alveolar ventilation.

817 V. A is calculated by which of the following formula ?

Harrison's 18th Ed. 2182

- A. Minute ventilation $\times (1 - V_d/V_t)$
- B. Minute ventilation $/ (1 - V_d/V_t)$
- C. Minute ventilation $+ (1 - V_d/V_t)$
- D. Minute ventilation $- (1 - V_d/V_t)$

V_A can be calculated as minute ventilation $\times (1 - V_d/V_t)$ where V_d/V_t represents dead space fraction.

818 Disturbances of $P_{a_{CO_2}}$ reflect which of the following ?

Harrison's 18th Ed. 2182

- A. Altered CO_2 production
- B. Minute ventilation
- C. Dead space fraction
- D. All of the above

All disorders of ventilation result in abnormal measurements of $P_{a_{CO_2}}$. All disturbances of $P_{a_{CO_2}}$ must reflect altered CO_2 production, minute ventilation, or dead space fraction.

819 Dorsal respiratory group (DRG) & ventral respiratory column (VRC) are located in ?

Harrison's 18th Ed. 2182

- A. Pleura
- B. Lung parenchyma
- C. Bronchial airways
- D. Medulla oblongata

The spontaneous cycle of inspiration & expiration is automatically generated in medulla through dorsal respiratory group (DRG) and ventral respiratory column (VRC).

820 DRG acts as the initial integration site for which of the following ?

Harrison's 18th Ed. 2182

- A. $P_{a_{O_2}}$
- B. $P_{a_{CO_2}}$
- C. pH
- D. All of the above

DRG acts as the initial integration site for afferent nerves bringing in information about partial pressure of arterial oxygen ($P_{a_{O_2}}$), $P_{a_{CO_2}}$, pH, and blood pressure from carotid and aortic chemoreceptors and baroreceptors to the central nervous system (CNS).

821 Which of the following nerves relay information from stretch receptors & juxtapulmonary-capillary receptors in lung parenchyma & chest wall to DRG ?

Harrison's 18th Ed. 2182

- A. Vagus nerve
- B. Phrenic nerve
- C. Intercostal nerves
- D. All of the above

Vagus nerve relays information from stretch receptors and juxtapulmonary-capillary receptors in the lung parenchyma and chest wall to the DRG.

822 Pre-Bötzinger complex is a part of ?

Harrison's 18th Ed. 2182

- A. DRG
- B. VRC

C. Parafacial respiratory group (pFRG)

D. All of the above

823 Which of the following is responsible for the generation of inspiratory activity ?

Harrison's 18th Ed. 2182

- A. DRG
- B. Parafacial respiratory group (pFRG)
- C. Pre-Bötzinger complex
- D. All of the above

824 Which of the following is responsible for the generation of expiratory activity ?

Harrison's 18th Ed. 2182

- A. DRG
- B. Parafacial respiratory group (pFRG)
- C. Pre-Bötzinger complex
- D. All of the above

The respiratory rhythm is generated within the VRC, as well as the more rostrally located parafacial respiratory group (pFRG), which is particularly important for the generation of active expiration. One particularly important area within the VRC is the so-called pre-Bötzinger complex. This area is responsible for the generation of various forms of inspiratory activity, and lesioning of the pre-Bötzinger complex leads to the complete cessation of breathing. The neural output of these medullary respiratory networks can be voluntarily suppressed or augmented by input from higher brain centers and the autonomic nervous system. During normal sleep there is an attenuated response to hypercapnia and hypoxemia resulting in mild nocturnal hypoventilation that corrects upon awakening.

825 Which of the following confirms chronic alveolar hypoventilation ?

Harrison's 18th Ed. 2183 - 84

- A. Elevated plasma bicarbonate
- B. Elevated $P_{a_{CO_2}}$
- C. Normal pH
- D. All of the above

Elevated plasma bicarbonate in the absence of volume depletion is suggestive of hypoventilation. An arterial blood gas demonstrating elevated $P_{a_{CO_2}}$ with a normal pH confirms chronic alveolar hypoventilation.

826 Which of the following is used to identify patients of alveolar hypoventilation ?

Harrison's 18th Ed. 2184

- A. Berlin Questionnaire
- B. Epworth Sleepiness Scale (ESS)
- C. STOP-Bang questionnaire
- D. All of the above

827 Which out of the following measures daytime sleepiness ?

Harrison's 18th Ed. 2184

- A. Berlin Questionnaire
- B. Epworth Sleepiness Scale (ESS)
- C. STOP-Bang questionnaire
- D. All of the above

Berlin Questionnaire has been validated in a primary care setting and identifies patients likely to have OSA. ESS measures daytime sleepiness. STOP-Bang survey is used in preoperative clinics to identify patients at risk of having OSA.

828 Which of the following parameter in PFT is used to monitor for respiratory muscle involvement in diseases with progressive muscle weakness ?

Harrison's 18th Ed. 2184

- A. Maximum inspiratory pressure
- B. Maximum expiratory pressure
- C. Forced vital capacity (FVC)
- D. All of the above

Respiratory muscle weakness has to be profound before lung volumes are compromised and hypercapnia develops. Measurement of maximum inspiratory and expiratory pressures or forced vital capacity (FVC) can be used to monitor for respiratory muscle involvement in diseases with progressive muscle weakness.

829 Which of the following stimulates respiration ?

Harrison's 18th Ed. 2184

- A. Acetazolamide
- B. Oestrogen
- C. Testosterone
- D. Norepinephrine

Pharmacologic agents that stimulate respiration are medroxyprogesterone and acetazolamide.

830 Which of the following is false about diagnosis of Obesity Hypoventilation Syndrome ?

Harrison's 18th Ed. 2184

- A. Body mass index (BMI) ≥ 30 kg/m²
- B. $Pa_{CO_2} \geq 45$ mmHg
- C. $Pa_{O_2} < 80$ mmHg
- D. Chronic daytime alveolar hypoventilation

Diagnosis of obesity hypoventilation syndrome (OHS) requires body mass index (BMI) ≥ 30 kg/m², sleep-disordered breathing and chronic daytime alveolar hypoventilation, defined as $Pa_{CO_2} \geq 45$ mmHg, and $Pa_{O_2} < 70$ mmHg in the absence of other known causes of hypercapnia.

831 Ondine's curse is best related to ?

Harrison's 18th Ed. 2185

- A. Hyperventilation
- B. Obstructive sleep apnea syndrome
- C. Central hypoventilation syndrome (CCHS)
- D. Obesity Hypoventilation Syndrome

Central Hypoventilation Syndrome can present later in life or in the neonatal period where it is often called Ondine's curse or congenital central hypoventilation syndrome (CCHS).

832 Which of the following gene has been implicated in the pathogenesis of congenital central hypoventilation syndrome ?

Harrison's 18th Ed. 2185

- A. PHOX1b
- B. PHOX2b
- C. PHOX3b
- D. PHOX4b

Abnormalities in the gene encoding PHOX2b, a transcription factor with a role in neuronal development, have been implicated in the pathogenesis of congenital central hypoventilation syndrome.

Chapter 265. Sleep Apnea

833 Obstructive sleep apnea/hypopnea syndrome (OSAHS) relates to ?

Harrison's 18th Ed. 2186

- A. Unexplained excessive daytime sleepiness
- B. Five obstructed apneas per hour of sleep

- C. Five obstructed hypopneas per hour of sleep
- D. All of the above

OSAHS may be defined as coexistence of unexplained excessive daytime sleepiness with at least five obstructed breathing events (apnea or hypopnea) per hour of sleep.

834 Apneas of what duration are considered significant ?

Harrison's 18th Ed. 2186

- A. At least 6 second
- B. At least 7 second
- C. At least 9 second
- D. At least 10 second

Apneas are defined in adults as breathing pauses lasting 10 second.

835 In hypopnea, ventilation is reduced from the previous baseline during sleep by at least ?

Harrison's 18th Ed. 2186

- A. 20 %
- B. 30 %
- C. 40 %
- D. 50 %

Hypopneas are 10 second events where there is continued breathing but the ventilation is reduced by at least 50% from the previous baseline during sleep.

836 How many obstructive events & arousals per hour of sleep define severe OSA ?

Harrison's 18th Ed. 2184

- A. > 5
- B. > 10
- C. > 20
- D. > 30

In severe OSA (significant daytime sleepiness or >30 obstructive events and arousals per hour of sleep), nasal continuous positive airway pressure (CPAP) is the treatment of choice.

837 Sleep apnea is defined as an intermittent cessation of airflow at the level of ?

Harrison's 16th Ed. 1573

- A. Oropharynx
- B. Nasopharynx
- C. Laryngopharynx
- D. All of the above

838 Which of the following statements is false ?

Harrison's 16th Ed. 1573

- A. Sleep apneas can be central or obstructive
- B. In CSA, neural drive to respiratory muscles is transiently abolished
- C. In OSA, airflow ceases despite respiratory drive
- D. None of the above

Sleep apneas can be central or obstructive. In CSA, neural drive to all respiratory muscles is transiently abolished. In OSA airflow ceases despite continuing respiratory drive because of occlusion of oropharyngeal airway.

839 The definitive event in obstructive sleep apnea is occlusion of upper airway usually at the level of ?

Harrison's 16th Ed. 1573

- A. Nasopharynx
- B. Oropharynx

- C. Laryngopharynx
- D. All of the above

In obstructive sleep apnea (OSA), airflow ceases despite continuing respiratory drive because of occlusion of oropharyngeal airway.

840 Main factor leading to collapse of upper airway in OSA is ?

Harrison's 16th Ed. 1573

- A. Critical sub-atmospheric pressure in inspiration
- B. Critical supra-atmospheric pressure in inspiration
- C. Spasm of airway adductor muscles
- D. All of the above

The immediate factor leading to collapse of upper airway in OSA is generation of a critical subatmospheric pressure during inspiration that exceeds the ability of airway dilator and abductor muscles to maintain airway stability.

841 Which of the following predispose to the development of OSA ?

Harrison's 16th Ed. 1573

- A. Alcohol
- B. Adenotonsillar hypertrophy
- C. Retrognathia
- D. All of the above

842 Which of the following predispose to the development of OSA ?

Harrison's 16th Ed. 1573

- A. Macroglossia
- B. Obesity
- C. Alcohol
- D. All of the above

Alcohol depresses activity of upper airway muscles & arousal response that terminates each apnea. Structural compromise due to adenotonsillar hypertrophy, retrognathia & macroglossia aggravate OSA. Obesity reduces size of upper airways by increasing fat deposition in soft tissues of pharynx or by compressing the pharynx by superficial fat masses in neck.

843 Factors that predispose to OSAHS include all except ?

Harrison's 18th Ed. 2186

- A. Male gender
- B. Shortening of mandible
- C. Shortening of maxilla
- D. Elderly

844 Factors that predispose to OSAHS include all except ?

Harrison's 18th Ed. 2186

- A. Smoking
- B. Myotonic dystrophy
- C. Lambert-Eaton myasthenic syndrome
- D. Ehlers Danlos syndrome

Factors predisposing to OSAHS include obesity, shortening of mandible &/or maxilla, male gender, middle age (40-65 years), hypothyroidism, acromegaly, myotonic dystrophy, Ehlers Danlos syndrome & smoking.

845 Risk factors for sleep apnea include all except ?

N Engl J Med 2002;347:498

- A. Obesity
- B. Increased neck circumference
- C. Short neck
- D. Craniofacial abnormalities

846 Risk factors for sleep apnea include all except ?

N Engl J Med 2002;347:498

- A. Hypothyroidism
- B. Acromegaly
- C. Mental retardation
- D. Obesity

847 Which of the following can cause day time sleepiness ?

N Engl J Med 2002;347:498

- A. Circadian-rhythm abnormality
- B. Narcolepsy
- C. Periodic limb movement disorder
- D. All of the above

848 Which of the following statements is false ?

Harrison's 16th Ed. 1574

- A. Majority of snoring individuals do not have OSA disorder
- B. Snoring is not associated with long-term health risks
- C. OSA manifestations are cognitive disturbances
- D. Patients with OSA are equally prone to motor vehicle accidents as normal individuals

Most pervasive manifestation of OSA is excessive daytime sleepiness. Motor vehicle accidents in OSA are 2 to 7 times more as compared with normal.

849 Sleepiness score is named after ?

Harrison's 18th Ed. 2187

- A. Dereck
- B. Epworth
- C. Hall
- D. Garcia

Epworth Sleepiness Score helps to detect troublesome sleepiness.

850 Electrographic variable studied in polysomnography for OSA is ?

Harrison's 16th Ed. 1574

- A. Electroencephalogram
- B. Electrooculogram
- C. Submental electromyogram
- D. All of the above

Definitive investigation for suspected OSA is polysomnography. It includes recording of electroencephalogram, electrooculogram, and submental electromyogram.

851 Which out of the following drug is useful in OSA ?

Harrison's 16th Ed. 1575

- A. Codeine
- B. Fluoxetine
- C. Theophylline
- D. Domperidone

852 Which out of the following drug is useful in OSA ?

Harrison's 16th Ed. 1575

- A. Acetazolamide
- B. Ipratropium bromide
- C. Theophylline
- D. Protriptyline

Medications are generally ineffective in management of OSA, except in patients with predominantly rapid eye movement sleep related events in whom protriptyline or fluoxetine may be beneficial.

853 Uvulopalatopharyngoplasty in OSA involves ?

N Engl J Med 2002;347:498

- A. Resection of tonsils
- B. Resection of Uvula & Posterior palate
- C. Reorientation of tonsillar pillars
- D. All of the above

854 Which of the following is central in the pathogenesis of CSA disorders ?

Harrison's 16th Ed. 1575

- A. PCO₂ level
- B. PO₂ level
- C. pH level
- D. All of the above

PCO₂ level of wakefulness is lower than that required for rhythm generation in sleep. Common to all CSA disorders is a PCO₂ level during sleep that falls transiently below the critical PCO₂ required for respiratory rhythm generation.

267. Approach to the Patient with Critical Illness

855 Which of the following is the most commonly used severity-of-illness (SOI) scoring system in North America ?

Harrison's 18th Ed. 2196

- A. APACHE I system
- B. APACHE II system
- C. APACHE III system
- D. APACHE IV system

APACHE II scoring system is the most commonly used severity-of-illness (SOI) scoring system in North America.

856 About 50% mortality is expected when APACHE II score in nonoperative cases is ?

Harrison's 18th Ed. 2198, Figure 267-1

- A. 15 - 19
- B. 20 - 24
- C. 25 - 29
- D. 30 - 34

857 Mean arterial pressure (MAP) is the product of cardiac output and ?

Harrison's 18th Ed. 2196

- A. Heart rate
- B. Stroke volume
- C. Pulse pressure
- D. Systemic vascular resistance (SVR)

Mean arterial pressure (MAP) is the product of cardiac output & systemic vascular resistance (SVR).

858 Most common cause of high cardiac output hypotension is ?

Harrison's 18th Ed. 2198

- A. Sepsis
- B. Thyrotoxicosis
- C. Anaphylaxis

D. Peripheral arteriovenous shunts

The most common cause of high cardiac output hypotension is sepsis. Other causes include liver failure, severe pancreatitis, burns and other trauma that elicit the systemic inflammatory response syndrome (SIRS), anaphylaxis, thyrotoxicosis, and peripheral arteriovenous shunts.

859 Respiratory failure can be ?

Harrison's 16th Ed. 1588

- A. Hypoxemic
- B. Hypercarbic
- C. Combined
- D. Any of the above

860 Alveolar unit consists of all except ?

Harrison's 16th Ed. 1588

- A. Respiratory bronchiole
- B. Terminal bronchiole
- C. Alveolar duct
- D. Alveoli

861 CO₂ challenge test is used to test which component of respiratory system ?

Harrison's 16th Ed. 1588

- A. Nervous system
- B. Muscles of breathing
- C. Airways
- D. Pulmonary vasculature

862 P_{0.1} test is used to test which component of respiratory system ?

Harrison's 16th Ed. 1588

- A. Nervous system
- B. Muscles of breathing
- C. Airways
- D. Pulmonary vasculature

863 Rapid-shallow-breathing index (RSBI) is calculated by ?

Harrison's 16th Ed. 1588

- A. Respiratory rate / FVC
- B. Respiratory rate / IC
- C. Respiratory rate / tidal volume
- D. Respiratory rate / minute volume

864 Type I respiratory failure best relates to which of the following ?

Harrison's 18th Ed. 2199

- A. Alveolar hypoventilation
- B. Alveolar flooding
- C. Hypoperfusion of respiratory muscles
- D. Lung atelectasis

865 Type II respiratory failure best relates to which of the following ?

Harrison's 18th Ed. 2200

- A. Alveolar hypoventilation
- B. Alveolar flooding
- C. Hypoperfusion of respiratory muscles
- D. Lung atelectasis

866 Type III respiratory failure best relates to which of the following ?

Harrison's 18th Ed. 2200

- A. Alveolar hypoventilation
- B. Alveolar flooding
- C. Hypoperfusion of respiratory muscles
- D. Lung atelectasis

867 Type IV respiratory failure best relates to which of the following ?

Harrison's 18th Ed. 2200

- A. Alveolar hypoventilation
- B. Alveolar flooding
- C. Hypoperfusion of respiratory muscles
- D. Lung atelectasis

868 All are true about Type I respiratory failure except ?

Harrison's 16th Ed. 1611

- A. Decreased PaO_2
- B. Decreased PaCO_2
- C. Normal PaCO_2
- D. Normal A-a gradient

869 Type I respiratory failure consists of ?

Harrison's 16th Ed. 1611

- A. Decreased PaO_2 , Normal or decreased PaCO_2
- B. Decreased PaO_2 , increased PaCO_2
- C. Decreased PaO_2 , decreased PaCO_2
- D. Increased PaO_2 , increased PaCO_2

870 In type II respiratory failure, there is ?

Harrison's 16th Ed. 1611

- A. Decreased PaO_2 , decreased PaCO_2
- B. Decreased PaO_2 , increased PaCO_2
- C. Normal PaO_2 , normal PaCO_2
- D. Increased PaO_2 , decreased PaCO_2

871 Type II respiratory failure is seen in ?

Harrison's 18th Ed. 2200

- A. COPD with cor pulmonale
- B. CRF
- C. ARDS
- D. Pulmonary fibrosing alveolitis

872 In hypothyroidism, which type of respiratory failure occurs ?

Harrison's 18th Ed. 2200

- A. Type I
- B. Type II
- C. Type III
- D. Type IV

873 In Guillain-Barre syndrome, which type of respiratory failure occurs ?

Harrison's 18th Ed. 2200

- A. Type I
- B. Type II

C. Type III

D. Type IV

874 In multiple blood transfusions, which type of respiratory failure occurs ?

Harrison's 18th Ed. 2199

- A. Type I
- B. Type II
- C. Type III
- D. Type IV

875 In ARDS, which type of respiratory failure occurs ?

Harrison's 18th Ed. 2199

- A. Type I
- B. Type II
- C. Type III
- D. Type IV

876 Perioperative respiratory failure is also called ?

Harrison's 18th Ed. 2200

- A. Type I
- B. Type II
- C. Type III
- D. Type IV

877 Respiratory failure type IV is seen in ?

Harrison's 18th Ed. 2200

- A. ARDS
- B. COPD
- C. CRF
- D. Shock

878 The ratio of partial pressure arterial oxygen and fraction of inspired oxygen is called ?

- A. Carrico index
- B. Girard index
- C. Abraham index
- D. Pronovost index

The ratio of partial pressure arterial oxygen and fraction of inspired oxygen, called P/F ratio or Carrico index, is a comparison between the oxygen level in the blood and the oxygen concentration that is breathed. $\text{PaO}_2/\text{FiO}_2$ ratio ≤ 200 mmHg gets diagnosis of ARDS.

879 Intubated patients having which of the following should undergo spontaneous breathing trial ?

Harrison's 18th Ed. 2200

- A. $\text{PaO}_2/\text{FiO}_2 > 200$
- B. $\text{PEEP} \leq 5 \text{ cmH}_2\text{O}$
- C. Cough & airway reflexes intact
- D. All of the above

Intubated patients having the following should undergo spontaneous breathing trial for 30 - 120 minutes : stable oxygenation ($\text{PaO}_2/\text{FiO}_2 > 200$ & $\text{PEEP} \leq 5 \text{ cmH}_2\text{O}$), cough & airway reflexes intact, and no vasopressor agents or sedatives.

880 Spontaneous breathing trial is declared a failure and must be stopped if ?

Harrison's 18th Ed. 2201

- A. Respiratory rate $> 35/\text{minute}$ for > 5 minutes

- B. O_2 saturation < 90%
- C. HR>140/min or 20% increase or decrease from baseline
- D. Any of the above

Spontaneous breathing trial is declared a failure and stopped if any of the following occur. Respiratory rate >35/minute for >5 minutes, O_2 saturation <90%, heart rate >140/min or a 20% increase or decrease from baseline, systolic blood pressure <90 mmHg or >180 mmHg and increased anxiety or diaphoresis.

881 Successful spontaneous breathing trial means that the ratio of respiratory rate & tidal volume in liters (fV_T) is ?

Harrison's 18th Ed. 2201

- A. < 55
- B. < 105
- C. < 135
- D. < 165

If, at the end of the spontaneous breathing trial, the ratio of the respiratory rate and tidal volume in liters (fV_T) is <105, patient can be extubated.

882 Postparalytic syndrome refers to ?

Harrison's 18th Ed. 2201

- A. Neuropathy
- B. Pneumothorax
- C. Myopathy
- D. Pneumonia

Use of neuromuscular blocking agents to facilitate mechanical ventilation may result in prolonged weakness - a myopathy known as the postparalytic syndrome.

883 Multiorgan system failure is defined by the simultaneous presence of physiologic dysfunction and/or failure of ?

Harrison's 18th Ed. 2201

- A. Two or more organs
- B. Three or more organs
- C. Four or more organs
- D. Five or more organs

Syndrome of multiorgan system failure is defined by the simultaneous presence of physiologic dysfunction and/or failure of two or more organs. Organ failure must persist beyond 24 hours. SIRS is a common basis for multiorgan system failure.

884 The "gold standard" for monitoring in the ICU is ?

Harrison's 18th Ed. 2201

- A. Pulse oximetry
- B. Arterial blood-gas analysis
- C. Circulatory Status
- D. Respiratory system mechanics

For monitoring in the ICU, evaluation of respiratory gas exchange is done by arterial blood-gas analysis which is the "gold standard".

885 Oxyhemoglobin reflects light more effectively than deoxyhemoglobin at wavelengths of ?

Harrison's 18th Ed. 2201

- A. 660 nm
- B. 720 nm
- C. 860 nm
- D. 940 nm

In pulse oximetry, at wavelengths of 660 nm, oxyhemoglobin reflects light more effectively than does deoxyhemoglobin, whereas the reverse is true in the infrared spectrum (940 nm). A pulse oximeter passes both wavelengths of light through a finger, and the relative intensity of light transmission at these two wavelengths is analysed to derive relative percentage of oxyhemoglobin.

886 Normally, respiratory system compliance is about ?

Harrison's 18th Ed. 2202

- A. 10 mL per cmH₂O
- B. 50 mL per cmH₂O
- C. 100 mL per cmH₂O
- D. 150 mL per cmH₂O

End-inspiratory pause (plateau pressure) is a static measurement, affected only by respiratory system compliance, not airway resistance. Normally, respiratory system compliance is ~100 mL per cmH₂O.

887 Normally, the content of O_2 in mixed venous blood (C_{O_2}) is ?

Harrison's 18th Ed. 2202

- A. 12.76 mL O_2 per dL blood
- B. 13.76 mL O_2 per dL blood
- C. 14.76 mL O_2 per dL blood
- D. 15.76 mL O_2 per dL blood

Oxygen delivery (Q_{O_2}) is a function of cardiac output and content of O_2 in arterial blood (Ca_{O_2}). Normally, content of O_2 in mixed venous blood (C_{O_2}) is 15.76 mL O_2 per dL blood, since the mixed venous blood is 75% saturated.

888 Normal tissue extraction ratio for O_2 is ?

Harrison's 18th Ed. 2202

- A. 8 %
- B. 15 %
- C. 25 %
- D. 33 %

The normal tissue extraction ratio for O_2 is $Ca_{O_2} - C_{O_2}/Ca_{O_2}$ ((21.16-15.76)/21.16) or 25 %.

Chapter 268. Acute Respiratory Distress Syndrome

889 Diagnostic criteria for ARDS is ?

Harrison's 18th Ed. 2205

- A. $PaO_2 / FiO_2 \leq 200$ mm Hg
- B. Acute onset
- C. Pulmonary capillary wedge pressure ≤ 18 mm Hg
- D. All of the above

890 Diagnostic criteria for ARDS include all except ?

Harrison's 18th Ed. 2205

- A. $PaO_2 / FiO_2 \leq 200$ mm Hg
- B. $PaO_2 / FiO_2 \leq 300$ mm Hg
- C. Acute onset
- D. Pulmonary capillary wedge pressure ≤ 18 mm Hg

$PaO_2 / FiO_2 \leq 300$ mm Hg is typical of Acute lung injury (ALI). Acute onset and PCWP ≤ 18 mm Hg being the same as in ARDS.

891 Which of the following is the most common situation leading to ARDS ?

Harrison's 18th Ed. 2205

- A. Multiple bone fractures
- B. Head trauma
- C. Burns
- D. Near drowning

Among patients with trauma, pulmonary contusion, multiple bone fractures, and chest wall trauma/flail chest are the most frequently reported surgical conditions in ARDS, whereas head trauma, near drowning, toxic inhalation, and burns are rare causes.

892 Scores for Acute Physiology, Age, and Chronic Health Evaluation (APACHE II) can range from ?

N Engl J Med 2003;348:683-93 Harrison's 17th Ed. 1680

- A. 0 to 61
- B. 0 to 71
- C. 0 to 81
- D. 0 to 91

Trauma patients with APACHE II score ≥ 16 have a 2.5-fold increase in risk of ARDS. Those with a score > 20 have an incidence of ARDS that is 3 fold greater than those with APACHE II scores ≤ 9 .

893 Phases of ARDS are all except ?

Harrison's 18th Ed. 2205

- A. Exudative
- B. Serofibrinous
- C. Proliferative
- D. Fibrotic

Natural history of ARDS, each having its own characteristic clinico-pathologic features is marked by three phases i.e. exudative, proliferative, and fibrotic.

894 Which of the following is a lipid mediator ?

Harrison's 18th Ed. 2205

- A. Interleukin 1
- B. Interleukin 8
- C. Tumor necrosis factor α
- D. Leukotriene B4

Significant concentrations of cytokines (interleukin 1, interleukin 8, and tumor necrosis factor alpha) and lipid mediators (leukotriene B4) are present in the lung in early exudative phase of ARDS.

895 Which of the following is not a feature of exudative phase of ARDS ?

Harrison's 18th Ed. 2205 Figure 268-1

- A. Alveolar edema
- B. Neutrophil-rich leukocytic infiltration
- C. Prominent interstitial inflammation
- D. Formation of hyaline membrane whorls

Exudative phase is notable for early alveolar edema and neutrophil-rich leukocytic infiltration of the lungs with subsequent formation of hyaline membranes from diffuse alveolar damage.

896 Which of the following is not a feature of exudative phase of ARDS ?

Harrison's 18th Ed. 2205

- A. Injury to alveolar capillary endothelial cells
- B. Injury to type I pneumocytes
- C. Proliferation of type II pneumocytes
- D. Vascular obliteration by microthrombi & fibrocellular proliferation

897 Which of the following is false about early ARDS ?

Harrison's 18th Ed. 2206

- A. Alveolar edema involves dependent portions of lung
- B. Hypercapnia is prominent in early ARDS
- C. Chest x-ray in ARDS rarely shows cardiomegaly
- D. None of the above

In exudative phase of ARDS, alveolar edema involves "dependent" portions of lung, leading to diminished aeration & atelectasis. With severe hypoxemia, hypercapnia secondary to an increase in pulmonary dead space is prominent. CxR rarely shows cardiomegaly, pleural effusions or pulmonary vascular redistribution.

898 After exposure to a precipitating ARDS risk factor, exudative phase encompasses how many days ?

Harrison's 18th Ed. 2206

- A. First 1 day
- B. First 3 days
- C. First 5 days
- D. First 7 days

Exudative phase encompasses first 7 days of illness after exposure to a precipitating ARDS risk factor.

899 Chest radiograph in exudative phase of ARDS shows alveolar & interstitial opacities involving ?

Harrison's 18th Ed. 2207

- A. One-third of lung fields
- B. One half of lung fields
- C. Two-thirds of lung fields
- D. Three-quarters of lung fields

CxR in exudative phase of ARDS reveals alveolar & interstitial opacities involving at least three-quarters of the lung fields.

900 Chest x-ray in exudative phase of ARDS rarely shows ?

Harrison's 18th Ed. 2207

- A. Cardiomegaly
- B. Pleural effusions
- C. Pulmonary vascular redistribution
- D. All of the above

Chest x-ray in exudative phase of ARDS rarely shows cardiomegaly, pleural effusions or pulmonary vascular redistribution.

901 In D/D of ARDS, which one of the following is least likely ?

Harrison's 18th Ed. 2207

- A. Cardiogenic pulmonary edema
- B. Hypersensitivity pneumonitis
- C. Diffuse pneumonia
- D. Alveolar hemorrhage

In D/D of ARDS, most common disorders are cardiogenic pulmonary edema, diffuse pneumonia, and alveolar hemorrhage. Less frequent diagnoses include acute interstitial lung diseases, hypersensitivity pneumonitis, radiation pneumonitis and neurogenic pulmonary edema.

902 Proliferative phase of ARDS usually lasts from ?

Harrison's 18th Ed. 2207

- A. Day 7 to 10
- B. Day 7 to 14
- C. Day 7 to 18
- D. Day 7 to 21

Proliferative phase of ARDS usually lasts from day 7 to day 21.

903 Histologically, in proliferative phase of ARDS, pulmonary infiltrate is ?

Harrison's 18th Ed. 2207

- A. Neutrophil predominant
- B. Lymphocyte predominant
- C. Eosinophil predominant

- D. Basophil predominant

In proliferative phase of ARDS, first signs of resolution are evident with initiation of lung repair, organization of alveolar exudates & a shift from a neutrophil to a lymphocyte-predominant pulmonary infiltrate.

904 Which of the following represents a reparative process in proliferative phase of ARDS ?

Harrison's 18th Ed. 2207

- A. Organization of alveolar exudates
- B. Lymphocyte-predominant pulmonary infiltrate
- C. Proliferation of type II pneumocytes
- D. All of the above

As part of the reparative process, there is a proliferation of type II pneumocytes along alveolar basement membranes.

905 Presence of procollagen III in alveolar space is associated with increased risk of death in patients of ?

Harrison's 18th Ed. 2207

- A. Pneumoconiosis
- B. Bronchial asthma
- C. ARDS
- D. All of the above

Presence of alveolar type III procollagen peptide (marker of pulmonary fibrosis), is associated with a protracted clinical course & increased mortality from ARDS.

906 Increased risk of pneumothorax is present in which phase of ARDS ?

Harrison's 18th Ed. 2207

- A. Exudative phase
- B. Proliferative phase
- C. Fibrotic phase
- D. All of the above

Increased risk of pneumothorax is present in fibrotic phase of ARDS.

907 Histologically, in fibrotic phase of ARDS, which of the following occurs ?

Harrison's 18th Ed. 2207

- A. Extensive alveolar duct
- B. Extensive interstitial fibrosis
- C. Large bullae
- D. All of the above

Histologically, alveolar edema & inflammatory exudates of earlier phases convert to extensive alveolar duct & interstitial fibrosis. Acinar architecture is markedly disrupted, leading to emphysema-like changes with large bullae.

908 Which of the following is false about normal alveolar epithelium ?

N Engl J Med 2002;342:1335

- A. Flat type I cells make up 90 % of alveolar surface area and are easily injured
- B. Cuboidal type II cells make up 10 % of alveolar surface area and are more resistant to injury
- C. Type II cell functions include surfactant production, ion transport, and proliferation & differentiation to type I cells after injury
- D. None of the above

909 In ARDS, what measure of tidal volume is preferred ?

Harrison's 18th Ed. 2207

- A. 6 mL/kg ideal body weight

- B. 8 mL/kg ideal body weight
- C. 10 mL/kg ideal body weight
- D. 12 mL/kg ideal body weight

Significantly lower mortality was observed in large-scale, randomized controlled trials in the low tidal volume patients (6 mL/kg predicted body weight) as compared to conventional tidal volume patients (12 mL/kg).

910 In ARDS, which of the following is a theoretical "optimal PEEP" for alveolar recruitment ?

Harrison's 18th Ed. 2208

- A. 0 - 5 mm Hg
- B. 5 - 12 mm Hg
- C. 12 - 15 mm Hg
- D. 15 - 18 mm Hg

In ARDS, 12 - 15 mmHg is a theoretical "optimal PEEP" for alveolar recruitment.

911 Inverse ratio ventilation refers to ?

Harrison's 18th Ed. 2208

- A. Prone-position ventilation
- B. Inspiratory time is longer than expiratory time
- C. Expiratory time is longer than inspiratory time
- D. Ventilating at extremely high respiratory rates

In inverse ratio ventilation technique, inspiratory time is lengthened so that it is longer than expiratory time. With diminished time to exhale, dynamic hyperinflation leads to increased end-expiratory pressure, similar to ventilator-prescribed PEEP.

912 Mechanical ventilation strategies used for ARDS are ?

Harrison's 18th Ed. 2208

- A. Partial liquid ventilation (PLV)
- B. High-frequency ventilation (HFV)
- C. Extracorporeal membrane oxygenation (ECMO)
- D. All of the above

913 Cause of pulmonary oedema in ARDS is ?

Harrison's 16th Ed. 1592

- A. Increased vascular permeability
- B. Increased hydrostatic pressure
- C. Lymphatic obstruction
- D. Physiological

914 All are predisposing factors of ARDS except ?

Harrison's 16th Ed. 1592

- A. Fat embolism
- B. Sepsis
- C. Multiple blood transfusions
- D. Status asthmaticus

915 Usually, pulmonary capillary wedge pressure in ARDS is ?

Harrison's 16th Ed. 1592

- A. Markedly increased
- B. Moderately increased
- C. Normal
- D. Decreased

916 All are true about ARDS except ?

Harrison's 16th Ed. 1592

- A. Widespread atelectasis

- B. Increased surfactant
- C. Ground glass mottling in X-Ray chest
- D. Cyanosis

917 All are true about ARDS except ?

Harrison's 16th Ed. 1592

- A. Pulmonary hypertension
- B. Normal PCWP
- C. Hypoxemia
- D. Low protein pulmonary oedema

918 Secondary factors that increases the risk for ARDS include ?

N Engl J Med 2000 ;342 :1335

- A. Chronic alcohol abuse
- B. Chronic lung disease
- C. Low serum pH
- D. All of the above

919 Secondary factors that increases risk for ARDS include except ?

N Engl J Med 2000;342:1335

- A. Chronic alcohol abuse
- B. Chronic lung disease
- C. Low serum pH
- D. High serum pH

920 Pneumonia caused by which of the following may be clinically indistinguishable from ARDS ?

Harrison's 18th Ed. 2227

- A. Haemophilus influenzae

- B. Neisseria meningitidis
- C. Pneumocystis
- D. Escherichia coli

Pneumonia caused by viruses or by Pneumocystis may be clinically indistinguishable from ARDS.

921 Which of the following is similar in presentation to acute respiratory distress syndrome (ARDS) ?

Harrison's 18th Ed. 2166

- A. Acute Interstitial Pneumonia
- B. Pulmonary Langerhans Cell Histiocytosis
- C. Cryptogenic Organizing Pneumonia
- D. Desquamative Interstitial Pneumonia

Acute Interstitial Pneumonia (Hamman-Rich Syndrome) is similar in presentation to acute respiratory distress syndrome (ARDS). AIP probably corresponds to the subset of cases of idiopathic ARDS. AIP is a fulminant form of lung injury characterized histologically by diffuse alveolar damage. Most patients are >40 years of age.

922 Adult respiratory distress syndrome (ARDS) can be caused by which of the following ?

Harrison's 18th Ed. Chapter e50

- A. Carbon monoxide
- B. Opioid
- C. Prolonged anoxia
- D. All of the above

ARDS can be caused by poisoning with carbon monoxide, cyanide, an opioid, paraquat, phencyclidine, a sedative-hypnotic, or salicylate; by inhalation of irritant gases, fumes, or vapors (acids and alkali, ammonia, aldehydes, chlorine, hydrogen sulfide, isocyanates, metal oxides, mercury, phosgene, polymers); or by prolonged anoxia, hyperthermia, or shock.

ANSWERS RESPIRATORY

1 A	40 B	79 A	118 D	157 C	196 D
2 D	41 C	80 D	119 B	158 C	197 A
3 D	42 B	81 D	120 D	159 D	198 B
4 D	43 D	82 A	121 C	160 C	199 D
5 D	44 C	83 B	122 B	161 C	200 D
6 D	45 B	84 A	123 C	162 A	201 D
7 A	46 A	85 D	124 C	163 B	202 D
8 D	47 D	86 A	125 A	164 A	203 D
9 D	48 C	87 C	126 A	165 A	204 D
10 A	49 C	88 C	127 D	166 B	205 A
11 D	50 A	89 B	128 D	167 A	206 A
12 A	51 D	90 B	129 B	168 D	207 D
13 C	52 D	91 A	130 C	169 C	208 C
14 D	53 D	92 C	131 B	170 A	209 D
15 A	54 D	93 C	132 C	171 C	210 D
16 D	55 D	94 C	133 A	172 C	211 D
17 C	56 D	95 C	134 B	173 A	212 C
18 A	57 D	96 B	135 C	174 C	213 D
19 D	58 D	97 A	136 D	175 D	214 A
20 C	59 C	98 A	137 B	176 C	215 D
21 B	60 B	99 D	138 D	177 D	216 B
22 A	61 A	100 B	139 D	178 B	217 B
23 D	62 B	101 D	140 D	179 D	218 A
24 B	63 B	102 D	141 C	180 D	219 A
25 B	64 D	103 A	142 D	181 D	220 A
26 A	65 D	104 A	143 A	182 C	221 D
27 C	66 C	105 B	144 C	183 C	222 A
28 D	67 A	106 B	145 A	184 A	223 C
29 C	68 B	107 C	146 D	185 C	224 A
30 D	69 A	108 D	147 A	186 C	225 D
31 C	70 C	109 C	148 A	187 D	226 C
32 D	71 B	110 C	149 A	188 C	227 D
33 A	72 A	111 B	150 B	189 C	228 A
34 B	73 A	112 D	151 D	190 B	229 A
35 C	74 B	113 C	152 B	191 A	230 D
36 A	75 B	114 D	153 A	192 A	231 B
37 D	76 A	115 C	154 A	193 C	232 A
38 C	77 A	116 A	155 D	194 A	233 D
39 D	78 A	117 D	156 C	195 C	234 D

ANSWERS RESPIRATORY

235 C	274 C	313 D	352 D	391 A	430 A
236 B	275 A	314 A	353 B	392 A	431 B
237 A	276 C	315 D	354 A	393 A	432 C
238 C	277 D	316 D	355 D	394 C	433 A
239 A	278 B	317 A	356 A	395 B	434 C
240 C	279 D	318 D	357 A	396 D	435 A
241 B	280 A	319 D	358 A	397 D	436 A
242 A	281 C	320 D	359 D	398 A	437 B
243 D	282 C	321 C	360 D	399 A	438 D
244 D	283 D	322 C	361 C	400 D	439 A
245 C	284 A	323 D	362 C	401 D	440 C
246 C	285 B	324 C	363 C	402 D	441 D
247 B	286 C	325 B	364 B	403 D	442 A
248 D	287 D	326 A	365 D	404 D	443 D
249 D	288 C	327 B	366 D	405 C	444 D
250 B	289 D	328 B	367 B	406 A	445 B
251 D	290 D	329 D	368 C	407 D	446 B
252 D	291 D	330 D	369 D	408 D	447 B
253 D	292 A	331 D	370 C	409 B	448 D
254 B	293 D	332 D	371 D	410 D	449 A
255 D	294 D	333 A	372 D	411 D	450 B
256 D	295 A	334 C	373 C	412 A	451 B
257 D	296 D	335 B	374 D	413 B	452 D
258 D	297 D	336 D	375 C	414 D	453 D
259 C	298 D	337 D	376 D	415 D	454 A
260 D	299 C	338 C	377 D	416 B	455 A
261 D	300 A	339 A	378 A	417 D	456 C
262 C	301 D	340 C	379 D	418 D	457 A
263 A	302 D	341 C	380 B	419 D	458 D
264 A	303 D	342 D	381 D	420 D	459 B
265 B	304 D	343 A	382 C	421 D	460 B
266 B	305 A	344 A	383 C	422 D	461 B
267 A	306 A	345 D	384 B	423 C	462 D
268 C	307 A	346 C	385 D	424 C	463 A
269 C	308 A	347 C	386 B	425 C	464 D
270 D	309 D	348 A	387 C	426 D	465 D
271 C	310 C	349 B	388 A	427 B	466 D
272 A	311 D	350 A	389 B	428 D	467 D
273 A	312 D	351 C	390 B	429 B	468 D

ANSWERS RESPIRATORY

469 A	508 B	547 D	586 D	625 D	664 C
470 D	509 D	548 D	587 D	626 D	665 B
471 D	510 B	549 D	588 D	627 D	666 D
472 D	511 D	550 A	589 D	628 C	667 C
473 D	512 A	551 C	590 C	629 D	668 A
474 A	513 B	552 A	591 C	630 B	669 C
475 B	514 D	553 B	592 A	631 D	670 D
476 B	515 B	554 D	593 D	632 D	671 D
477 D	516 C	555 C	594 C	633 A	672 C
478 A	517 A	556 D	595 D	634 A	673 B
479 A	518 C	557 A	596 B	635 A	674 D
480 D	519 C	558 D	597 D	636 D	675 C
481 A	520 C	559 C	598 D	637 B	676 D
482 B	521 C	560 B	599 D	638 D	677 C
483 B	522 B	561 A	600 B	639 D	678 C
484 C	523 D	562 D	601 A	640 C	679 D
485 D	524 D	563 A	602 A	641 D	680 D
486 B	525 C	564 D	603 B	642 D	681 D
487 D	526 A	565 D	604 A	643 B	682 B
488 D	527 D	566 D	605 D	644 A	683 C
489 C	528 D	567 B	606 D	645 A	684 D
490 D	529 C	568 D	607 C	646 C	685 A
491 D	530 D	569 B	608 C	647 D	686 C
492 A	531 C	570 C	609 D	648 A	687 D
493 B	532 A	571 C	610 C	649 D	688 D
494 C	533 A	572 A	611 B	650 D	689 D
495 B	534 D	573 A	612 C	651 D	690 B
496 D	535 B	574 D	613 C	652 D	691 B
497 A	536 C	575 D	614 B	653 B	692 D
498 A	537 D	576 C	615 A	654 D	693 A
499 B	538 B	577 B	616 C	655 A	694 C
500 A	539 A	578 C	617 D	656 B	695 B
501 C	540 C	579 D	618 B	657 A	696 A
502 C	541 A	580 D	619 D	658 A	697 C
503 C	542 D	581 A	620 C	659 D	698 C
504 D	543 A	582 A	621 B	660 D	699 B
505 D	544 A	583 D	622 D	661 A	700 A
506 D	545 D	584 B	623 D	662 C	701 D
507 B	546 C	585 D	624 D	663 C	702 D

ANSWERS RESPIRATORY

703 D	742 A	781 A	820 D	859 D	898 D
704 C	743 D	782 D	821 A	860 B	899 D
705 C	744 A	783 C	822 B	861 A	900 D
706 B	745 D	784 A	823 C	862 A	901 B
707 B	746 A	785 B	824 B	863 C	902 D
708 B	747 D	786 D	825 D	864 B	903 B
709 C	748 A	787 A	826 D	865 A	904 C
710 D	749 B	788 B	827 B	866 D	905 C
711 D	750 D	789 D	828 D	867 C	906 C
712 D	751 D	790 D	829 A	868 D	907 D
713 D	752 D	791 D	830 C	869 A	908 D
714 C	753 D	792 C	831 C	870 B	909 A
715 A	754 D	793 C	832 B	871 A	910 C
716 B	755 A	794 A	833 D	872 B	911 B
717 B	756 B	795 D	834 D	873 B	912 D
718 B	757 C	796 A	835 D	874 A	913 A
719 B	758 D	797 A	836 D	875 A	914 D
720 C	759 B	798 B	837 A	876 C	915 C
721 D	760 B	799 C	838 D	877 D	916 B
722 D	761 B	800 C	839 B	878 A	917 D
723 C	762 D	801 A	840 A	879 D	918 D
724 D	763 D	802 B	841 D	880 D	919 D
725 C	764 A	803 A	842 D	881 B	920 C
726 D	765 D	804 C	843 D	882 C	921 A
727 C	766 B	805 A	844 C	883 A	922 D
728 B	767 D	806 D	845 C	884 B	
729 D	768 C	807 D	846 C	885 A	
730 C	769 A	808 D	847 D	886 C	
731 D	770 A	809 C	848 D	887 D	
732 D	771 D	810 A	849 B	888 C	
733 B	772 C	811 D	850 D	889 D	
734 D	773 D	812 D	851 B	890 B	
735 B	774 B	813 D	852 D	891 A	
736 A	775 D	814 D	853 D	892 B	
737 B	776 B	815 C	854 A	893 B	
738 D	777 B	816 B	855 B	894 D	
739 A	778 A	817 A	856 C	895 C	
740 D	779 C	818 D	857 D	896 C	
741 D	780 A	819 D	858 A	897 D	

Chapter 44. Azotemia and Urinary Abnormalities

1 Normal combined kidney volume is about ?

- A. 100 to 150 cm³
- B. 150 to 200 cm³
- C. 200 to 300 cm³
- D. 250 to 400 cm³

Normal combined kidney volume is about 250 to 400 cm³

2 Which of the following organs has the maximum blood flow per gram ?

Harrison's 17th Ed 1742

- A. Brain
- B. Heart
- C. Liver
- D. Kidney

Renal blood flow drains ~20% of cardiac output or 1000 mL/minute.

3 Value of creatinine clearance is expressed in ?

Harrison's 18th Ed 334

- A. mL / minute
- B. mL / hour
- C. mL / day
- D. mL / kg / minute

Creatinine clearance is calculated for a defined time period (24 hours) & is expressed in mL/minute.

4 In general, patients do not develop symptomatic uremia until GFR is ?

Harrison's 18th Ed 334

- A. < 15 mL / minute
- B. < 45 mL / minute
- C. < 60 mL / minute
- D. < 90 mL / minute

In general, patients do not develop symptomatic uremia until renal insufficiency is usually quite severe (GFR < 15 mL/minute).

5 Cystatin C estimation is a renal function equivalent of ?

N Engl J Med 2006;354:2473-83

- A. Urea
- B. Creatinine
- C. Ammonium
- D. Inulin

6 Which of the following is false about Cystatin C ?

Harrison's 18th Ed 335

- A. Member of cysteine protease inhibitors
- B. Produced from all nucleated cells
- C. Production not affected by diet or nutritional status
- D. None of the above

Cystatin C is a member of cystatin superfamily of cysteine protease inhibitors, produced at a relatively constant rate from all nucleated cells. Cystatin C production is not affected by diet or nutritional status. It provides a more sensitive indicator of GFR than the plasma creatinine concentration.

7 For calculating GFR by Cockcroft-Gault formula, the value is multiplied by what factor for women ?

Harrison's 18th Ed 334

- A. 0.55
- B. 0.65
- C. 0.75
- D. 0.85

For calculating GFR by Cockcroft-Gault formula, the value is multiplied by 0.85 for women a lower fraction of the body weight is composed of muscle.

8 Which of the following is not used to estimate GFR ?

Harrison's 18th Ed 334

- A. Insulin clearance
- B. MDRD (modification of diet in renal disease)
- C. Cockcroft-Gault formula
- D. ¹²⁵I-iothalamate

9 There occurs a steep decline in GFR when mean arterial pressure falls below ?

Harrison's 18th Ed 337

- A. 80 mm Hg
- B. 90 mm Hg
- C. 100 mm Hg
- D. 110 mm Hg

Once the mean arterial pressure falls below 80 mmHg, there is a steep decline in GFR.

10 The BUN / P_{Cr} ratio in prerenal azotemia is ?

Harrison's 18th Ed 337 Table 44-2

- A. > 5 : 1
- B. > 10 : 1
- C. > 15 : 1
- D. > 20 : 1

BUN/P_{Cr} ratio in prerenal azotemia is > 20 : 1. It is 10 - 15:1 in oliguric acute renal failure.

11 Which of the following is false in prerenal azotemia ?

Harrison's 18th Ed 337 Table 44-2

- A. Urine sodium (U_{Na}) <20 meq/L
- B. Urine osmolality >500 mosmol/L H₂O
- C. Fractional excretion of sodium (FE_{Na}) >2%
- D. Urine/plasma creatinine (U_{Cr}/P_{Cr}) >40

In prerenal azotemia, Fractional excretion of sodium (FE_{Na}) is <1%.

12 Which of the following formula is correct to calculate fractional excretion of sodium (FE_{Na}) ?

Harrison's 18th Ed 337 Table 44-2

- A. $\frac{U_{Na} + U_{cr} \times 100}{(P_{Na} + P_{cr})}$
- B. $\frac{U_{Na} \times P_{cr} \times 100}{(P_{Na} \times U_{cr})}$
- C. $\frac{U_{Na} \times P_{cr} \times 100}{(P_{Na} \times U_{cr})}$
- D. $\frac{U_{Na} \times P_{cr} \times 100}{(P_{Na} \times U_{cr})}$

13 Evidence of which of the following is present in ATN ?

Harrison's 18th Ed 337

- A. Structural collecting duct injury
- B. Structural glomerular injury
- C. Structural tubule injury

D. All of the above

Prolonged renal hypoperfusion can lead to acute tubular necrosis (ATN) and evidence of structural tubule injury is present in ATN.

14 Renal blood flow constitutes what percentage of cardiac output ?

Harrison's 18th Ed 338

- A. 5 %
- B. 10 %
- C. 15 %
- D. 25 %

Renal blood flow is approximately 25% of cardiac output, or 1000 mL/minute.

15 Stigmata of atheroemboli is ?

Harrison's 18th Ed 337

- A. Livedo reticularis
- B. Distal peripheral infarcts
- C. Eosinophilia
- D. All of the above

Stigmata of atheroemboli are livedo reticularis, distal peripheral infarcts, eosinophilia.

16 Which of the following statements is false ?

Harrison's 18th Ed 337

- A. Renal artery thrombosis leads to mild proteinuria & hematuria
- B. Renal vein thrombosis leads to heavy proteinuria & hematuria
- C. Eosinophils in urine suggest atheroembolic renal disease
- D. None of the above

Eosinophils in urine suggest allergic interstitial nephritis or atheroembolic renal disease.

17 Oliguria refers to a 24-hour urine output of ?

Harrison's 18th Ed 338

- A. < 200 mL
- B. < 300 mL
- C. < 400 mL
- D. < 500 mL

Oliguria refers to a 24-hour urine output of < 400 mL.

18 Anuria refers to a 24-hour urine output of ?

Harrison's 18th Ed 338

- A. < 300 mL
- B. < 200 mL
- C. < 100 mL
- D. < 50 mL

Anuria is the complete absence of urine formation (< 100 mL).

19 Urine output of > 400 mL/day in acute or chronic azotemia is called ?

Harrison's 18th Ed 338

- A. False anuria
- B. Nonanuria
- C. Nonoliguria
- D. False azotemia

Nonoliguria refers to urine output >400 mL/day in patients with acute or chronic azotemia.

20 Which of the following is false about dipstick measurement of proteinuria ?

Harrison's 18th Ed 338

- A. False-positive when urine pH is > 7.0
- B. False-positive when urine is very concentrated
- C. False-positive when urine is contaminated with blood
- D. None of the above

Dipstick measurement detects albumin and gives false-positive results when urine pH > 7.0, urine is very concentrated or contaminated with blood.

21 Proteins of what size are freely filtered by the kidneys ?

Harrison's 18th Ed 338

- A. < 20 kDa
- B. < 30 kDa
- C. < 40 kDa
- D. < 50 kDa

Smaller proteins (<20 kDa) are freely filtered but are readily reabsorbed by the proximal tubule.

22 Normal individuals excrete what amount of total protein in urine ?

Harrison's 18th Ed 338

- A. < 150 mg / day
- B. < 200 mg / day
- C. < 250 mg / day
- D. < 300 mg / day

23 Normal individuals excrete what amount of albumin in urine ?

Harrison's 18th Ed 338

- A. < 30 mg / day
- B. < 100 mg / day
- C. < 200 mg / day
- D. < 300 mg / day

Normal individuals excrete <150 mg/day of total protein and <30 mg/day of albumin.

24 Which of the following is secreted by renal tubules ?

Harrison's 18th Ed 338

- A. Tamm-Horsfall protein
- B. IgA
- C. Urokinase
- D. All of the above

25 Which of the following is not secreted by renal tubules ?

Harrison's 18th Ed 338

- A. Tamm-Horsfall protein
- B. IgA
- C. Urokinase
- D. Beta₂-microglobulin

Tamm-Horsfall, IgA, and urokinase in urine is secreted by the tubules. Small amounts of beta₂-microglobulin, apoproteins, enzymes, and peptide hormones are filtered.

26 Size of pores of normal glomerular endothelial cell is ?

Harrison's 18th Ed 338

- A. ~50 nm
- B. ~100 nm
- C. ~150 nm

D. ~200 nm

Normal glomerular endothelial cell forms a barrier composed of pores of ~100 nm that hold back blood cells but allow passage of most proteins.

27 Disease that allows "selective" loss of albumin is ?

Harrison's 18th Ed 338

- A. Diabetes
- B. Focal segmental glomerulosclerosis (FSGS)
- C. Minimal change disease
- D. Hypertension

"Selective" loss of albumin is seen in minimal change disease. Diabetes & FSGS lead to "nonselective" loss of all plasma proteins. Hypertension, CRF cause increased tubular protein loss.

28 Urinary protein excretion of >3.5 grams/day can occur without the features of nephrotic syndrome in ?

Harrison's 18th Ed 338

- A. Diabetes
- B. Amyloidosis
- C. Minimal change disease
- D. All of the above

29 Urinary protein excretion of >3.5 grams/day can occur without the features of nephrotic syndrome in ?

Harrison's 18th Ed 338

- A. Focal segmental glomerulosclerosis (FSGS)
- B. Membranous glomerulopathy
- C. Membranoproliferative glomerulonephritis (MPGN)
- D. All of the above

30 Mechanism of renal failure due to plasma cell dyscrasias is ?

Harrison's 18th Ed 339

- A. Fusion of glomerular epithelial cell foot processes
- B. Disruption of basement membrane & slit diaphragms
- C. Tubule obstruction (cast nephropathy)
- D. All of the above

Renal failure from plasma cell dyscrasias (multiple myeloma) occurs due to tubule obstruction (cast nephropathy) and light chain deposition.

31 Mechanisms of edema formation in hypoalbuminemia is the activation of ?

Harrison's 18th Ed 339

- A. Renin-angiotensin system
- B. Antidiuretic hormone
- C. Sympathetic nervous system
- D. All of the above

Hypoalbuminemia in nephrotic syndrome is due to excessive urinary losses & increased proximal tubule catabolism of filtered albumin. Edema forms from renal sodium retention & reduced plasma oncotic pressure. Mechanisms include activation of renin-angiotensin system, antidiuretic hormone, & sympathetic nervous system, all of which promote excessive renal salt & water reabsorption.

32 In nephrotic syndrome, which of the following protein is lost ?

Harrison's 17th Ed 272

- A. Thyroxine-binding globulin
- B. Cholecalciferol-binding protein
- C. Transferrin
- D. All of the above

In nephrotic syndrome, thyroxine-binding globulin, cholecalciferol-binding protein, transferrin, metal-binding proteins, antithrombin III, proteins S & C, fibrinogen and IgG are lost.

33 Hypercoagulable state in nephrotic syndrome is due to urinary loss of ?

Harrison's 18th Ed 339

- A. Antithrombin III
- B. Proteins S & C
- C. Fibrinogen
- D. All of the above

Hypercoagulable state in severe nephrotic syndrome is due to urinary losses of antithrombin III, proteins S & C and fibrinogen.

34 Normal red blood cell excretion in urine is ?

Harrison's 17th Ed 272

- A. ~ 2 million RBCs per day
- B. ~ 3 million RBCs per day
- C. ~ 4 million RBCs per day
- D. ~ 5 million RBCs per day

Normal red blood cell excretion is up to 2 million RBCs per day.

35 Hematuria is defined as how many RBCs per high-power field ?

Harrison's 17th Ed 272

- A. 2 - 5
- B. 5 - 8
- C. 8 - 12
- D. 12 - 15

Hematuria is defined as 2 to 5 RBCs per high-power field (HPF) & can be detected by dipstick.

36 Persistent or significant hematuria means ?

Harrison's 18th Ed 339

- A. > 3 RBCs/HPF on three urinalyses
- B. Single urinalysis with >100 RBCs
- C. Gross hematuria
- D. All of the above

Persistent or significant hematuria means >3 RBCs/HPF on three urinalyses, or a single urinalysis with >100 RBCs, or gross hematuria.

37 Isolated hematuria may be a feature of all except ?

Harrison's 18th Ed 339

- A. Urogenital neoplasms
- B. Hypercalciuria
- C. Hyperoxaluria
- D. Hyperuricosuria

Urogenital neoplasms present as isolated painless hematuria with nondysmorphic RBCs. Hypercalciuria & hyperuricosuria are risk factors for unexplained isolated hematuria in children & adults.

38 Isolated glomerular hematuria can occur in ?

Harrison's 18th Ed 339

- A. IgA nephropathy
- B. Hereditary nephritis
- C. Thin basement membrane disease
- D. All of the above

Common etiologies of isolated glomerular hematuria are IgA nephropathy, hereditary nephritis, and thin basement membrane disease.

39 Which of the following urinary feature is diagnostic of glomerulonephritis ?

Harrison's 18th Ed 339

- A. Hematuria with dysmorphic RBCs
- B. RBC casts
- C. Protein excretion >500 mg/day
- D. All of the above

Hematuria with dysmorphic RBCs, RBC casts, and protein excretion >500 mg/day is virtually diagnostic of glomerulonephritis.

40 In urine, WBC's &/or WBC casts are seen in ?

Harrison's 17th Ed 273

- A. Interstitial nephritis
- B. Systemic lupus erythematosus
- C. Transplant rejection
- D. All of the above

WBC's &/or WBC casts in urine are seen in tubulointerstitial diseases like interstitial nephritis, SLE and transplant rejection.

41 Urinary sediment of ATN has which of the following casts ?

Harrison's 18th Ed 337

- A. Cellular debris
- B. RBC cast
- C. Waxy cast
- D. Broad cast

Urinary sediment of ATN is filled with cellular debris & dark (muddy brown) granular casts.

42 Waxy casts refer to ?

Harrison's 18th Ed 339

- A. Lipid bodies
- B. Oval fat bodies
- C. Degenerated cellular casts
- D. Any of the above

In chronic renal diseases, degenerated cellular casts called waxy casts can be seen in the urine.

43 Broad casts are diagnostic of ?

Harrison's 18th Ed 339

- A. Pyelonephritis
- B. Chronic renal failure
- C. Membranoproliferative glomerulonephritis (MPGN)
- D. All of the above

Broad casts arise in dilated tubules of enlarged nephrons that have undergone compensatory hypertrophy in response to reduced renal mass as in chronic renal failure.

44 Which of the following statements is false ?

Harrison's 16th Ed. 250

- A. Oliguria refers to a 24-h urine output of < 400 mL
- B. Normal individuals excrete < 150 mg/day of total protein
- C. Normal individuals excrete ~ 30 mg/day of albumin
- D. Polyuria is defined as urine output of > 3 L/day

Oliguria refers to a 24-hour urine output of < 500 mL.

45 Polyuria is defined as a 24-hour urine output of ?

Harrison's 18th Ed 340

- A. > 2 L/day

- B. > 3 L/day
- C. > 4 L/day
- D. > 5 L/day

Polyuria is defined as a 24-hour urine output of >3 L/day.

46 An average person excretes how much of solutes per day ?

Harrison's 18th Ed 340

- A. 200 - 600 mosmol / day
- B. 600 - 800 mosmol / day
- C. 800 - 1400 mosmol / day
- D. 1400 - 1800 mosmol / day

Average person excretes 600 - 800 mosmol of solutes per day, primarily as urea & electrolytes.

47 In polyuria (>3 L/day) with dilute urine (<250 mosmol/L), the cause is ?

Harrison's 18th Ed 340

- A. Polydipsia
- B. Central diabetes insipidus
- C. Nephrogenic diabetes insipidus
- D. Any of the above

In polyuria (>3 L/day) with dilute urine (<250 mosmol/L), the cause can be polydipsia, central diabetes insipidus, or nephrogenic diabetes insipidus.

48 Which of the following is a poorly reabsorbed solute ?

Harrison's 18th Ed 340

- A. Glucose
- B. Mannitol
- C. Urea
- D. All of the above

Poorly reabsorbed solutes are glucose, mannitol or urea.

49 Which of the following is a "salt-wasting disorder" ?

Harrison's 18th Ed 340

- A. Cystic renal diseases
- B. Bartter's syndrome
- C. Resolving ATN
- D. All of the above

Cystic renal diseases, Bartter's syndrome, or a resolving ATN are salt-wasting disorders.

Composition of body fluids

50 Water comprises what percentage of body weight in women ?

Harrison's 18th Ed 341

- A. ~ 50 %
- B. ~ 60 %
- C. ~ 70 %
- D. ~ 80 %

51 Water comprises what percentage of body weight in men ?

Harrison's 18th Ed 341

- A. ~ 50 %
- B. ~ 60 %
- C. ~ 70 %

D. ~ 80 %

Water comprises ~50% of body weight in women and ~60% in men.

52 What percentage of total body water is found as intracellular fluid (ICF) ?

Harrison's 18th Ed 341

- A. 15 - 35 %
- B. 35 - 55 %
- C. 55 - 75 %
- D. 75 - 95 %

53 What percentage of total body water is found as extracellular fluid (ECF) ?

Harrison's 18th Ed 341

- A. 15 - 25 %
- B. 25 - 45 %
- C. 45 - 55 %
- D. 55 - 75 %

55-75% of body water is present as intracellular fluid (ICF) & 25-45% as extracellular fluid (ECF).

54 Ratio of water in intravascular and extravascular spaces is ?

Harrison's 18th Ed 341

- A. 1 : 2
- B. 2 : 1
- C. 1 : 3
- D. 3 : 1

Ratio of intravascular (plasma water) & extravascular (interstitial) ECF water is 1 : 3.

55 Which of the following is correct ?

Harrison's 18th Ed 341

- A. ECF osmolality = ICF osmolality
- B. ECF osmolality < ICF osmolality
- C. ECF osmolality > ICF osmolality
- D. Any of the above

Osmotic equilibrium refers to ECF osmolality = ICF osmolality.

56 Which of the following is an 'osmolyte' ?

Harrison's 18th Ed 347

- A. Myo-inositol
- B. Betaine
- C. Creatine
- D. All of the above

Organic solutes, also called osmolytes are creatine, betaine, glutamate, myo-inositol & taurine..

57 Which of the following is a reflection of ECF volume ?

Harrison's 18th Ed 342

- A. Total body Na⁺
- B. Total body K⁺
- C. Total body Cl⁻
- D. Total body HCO₃⁻

Total body Na⁺ content reflects ECF volume as it is restricted to extracellular compartment.

58 A change in ICF osmolality is due to a change in ?

Harrison's 17th Ed 275

- A. ICF water content

B. ICF Na⁺ content

C. ICF K⁺ content

D. ICF Cl⁻ content

A change in ICF osmolality is usually due to a change in ICF water content.

59 Which of the following is known as "ineffective osmole" ?

Harrison's 18th Ed 341

- A. Inositol
- B. Phospholipids
- C. Urea
- D. All of the above

Solutes like urea do not contribute to water shift across cell membranes and are known as ineffective osmoles. Ineffective osmoles like urea & glucose do not play a role in stimulating thirst.

60 Maximal urine osmolality can be ?

Harrison's 18th Ed 342

- A. 500 mosmol/kg
- B. 800 mosmol/kg
- C. 1000 mosmol/kg
- D. 1200 mosmol/kg

61 Minimum urine osmolality in humans can be ?

Harrison's 18th Ed 342

- A. 50 mosmol/kg
- B. 100 mosmol/kg
- C. 150 mosmol/kg
- D. 200 mosmol/kg

62 Thirst is mediated by ?

Harrison's 18th Ed 341

- A. Increase in effective osmolality
- B. Decrease in ECF volume
- C. Decrease in blood pressure
- D. All of the above

Primary stimulus for water ingestion is thirst mediated either by an increase in effective osmolality or a decrease in ECF volume or blood pressure.

63 'Osmoreceptors' are located in ?

Harrison's 17th Ed 275

- A. Posterior pituitary
- B. Anterolateral hypothalamus
- C. Posteromedial hypothalamus
- D. All of the above

Osmoreceptors, located in the anterolateral hypothalamus, are stimulated by a rise in tonicity.

64 Average osmotic threshold for thirst is approximately ?

Harrison's 17th Ed 275

- A. 289 mosmol/kg
- B. 291 mosmol/kg
- C. 293 mosmol/kg
- D. 295 mosmol/kg

Average osmotic threshold for thirst is ~ 295 mosmol/kg & varies among individuals.

65 Arginine vasopressin is synthesized in ?

Harrison's 18th Ed 341

- A. Hypothalamus

- B. Anterior pituitary gland
- C. Posterior pituitary gland
- D. All of the above

66 Arginine vasopressin (AVP) is secreted by ?

Harrison's 18th Ed 341

- A. Hypothalamus
- B. Anterior pituitary gland
- C. Posterior pituitary gland
- D. All of the above

Arginine vasopressin (AVP) or antidiuretic hormone (ADH) is a polypeptide synthesized in supraoptic & paraventricular nuclei of hypothalamus & secreted by posterior pituitary gland.

67 Receptor to which AVP binds in renal collecting ducts is ?

Harrison's 18th Ed 341

- A. U_2 receptor
- B. V_2 receptor
- C. W_2 receptor
- D. X_2 receptor

68 Water channels in collecting ducts activated by AVP are encoded by ?

Harrison's 18th Ed 341

- A. Aquaporin-1 gene
- B. Aquaporin-2 gene
- C. Aquaporin-3 gene
- D. Aquaporin-4 gene

AVP binds to V_2 receptors on basolateral membrane of principal cells in the collecting duct activating the water channels which are encoded by aquaporin-2 gene.

69 Osmotic threshold for AVP release is ?

Harrison's 18th Ed 341

- A. 260 to 270 mosmol/kg
- B. 270 to 280 mosmol/kg
- C. 280 to 290 mosmol/kg
- D. 290 to 300 mosmol/kg

Osmotic threshold for AVP release is 280-290 mosmol/kg. It maintains plasma osmolality within a 1 - 2 % range.

70 Nonosmotic factors that regulate AVP secretion include ?

Harrison's 17th Ed 275

- A. Effective arterial volume
- B. Pregnancy
- C. Hypoglycemia
- D. All of the above

Nonosmotic factors that regulate AVP secretion include effective circulating (arterial) volume, nausea, pain, stress, hypoglycemia, pregnancy & numerous drugs.

71 Individuals eating a typical western diet consume what amount of NaCl daily ?

Harrison's 17th Ed 275

- A. ~ 50 mmol
- B. ~ 150 mmol
- C. ~ 250 mmol
- D. ~ 500 mmol

Individuals eating a typical western diet consume ~150 mmol of NaCl daily.

72 Major regulatory mechanism controlling sodium excretion is ?

Harrison's 18th Ed 342

- A. GFR
- B. Tubule Na^+ reabsorption
- C. Tubule water reabsorption
- D. All of the above

Tubule Na^+ reabsorption, and not GFR, is the major regulatory mechanism controlling Na^+ excretion.

73 Majority of filtered sodium is reabsorbed in ?

Harrison's 18th Ed 342

- A. Proximal convoluted tubule
- B. Thick ascending limb of loop of Henle
- C. Distal convoluted tubule
- D. Cortical and medullary collecting ducts

74 Reabsorption of filtered sodium mediated by 'thiazide - sensitive Na^+ - Cl^- cotransporter' occurs in ?

Harrison's 18th Ed 342

- A. Proximal convoluted tubule
- B. Thick ascending limb of loop of Henle (TALH)
- C. Distal convoluted tubule
- D. Cortical & medullary collecting ducts

75 Reabsorption of filtered sodium mediated by ' Na^+ - K^+ - $2Cl^-$ cotransporter' occurs in ?

Harrison's 18th Ed 342

- A. Proximal convoluted tubule
- B. Thick ascending limb of the loop of Henle (TALH)
- C. Distal convoluted tubule
- D. Cortical and medullary collecting ducts

Almost two-thirds of filtered Na^+ is reabsorbed in the proximal convoluted tubule. 25-30% occurs in TALH via apical Na^+ - K^+ - $2Cl^-$ co-transporter. 5% occurs in DCT mediated by thiazide-sensitive Na^+ - Cl^- co-transporter. Na^+ reabsorption also occurs in cortical and medullary collecting ducts.

76 What quantity of fluid enters gastrointestinal tract daily as secretions ?

Harrison's 18th Ed 343

- A. ~ 3 liters
- B. ~ 5 liters
- C. ~ 7 liters
- D. ~ 9 liters

~ 9 liters of fluid enters GI tract daily, 2 by ingestion & 7 liters by secretion.

77 Fecal fluid loss is ?

Harrison's 18th Ed 343

- A. 100 - 200 mL / day
- B. 200 - 300 mL / day
- C. 300 - 400 mL / day
- D. 400 - 500 mL / day

Fecal fluid loss is 100 - 200 mL/day.

78 Normally, sodium concentration of sweat is ?

Harrison's 17th Ed 276

- A. 10 to 20 mmol/L
- B. 20 to 50 mmol/L

- C. 50 to 100 mmol/L
- D. 120 to 150 mmol/L

Na⁺ concentration of sweat is 20-50 mmol/L and decreases with profuse sweating due to the action of aldosterone. Since sweat is hypotonic, the loss of water exceeds that of Na⁺.

79

Enhanced reabsorption of Na⁺ by collecting duct occurs due to ?

Harrison's 18th Ed 342

- A. Increased aldosterone
- B. Increased AVP secretion
- C. Suppressed atrial natriuretic peptide secretion
- D. All of the above

Enhanced reabsorption of Na⁺ by collecting duct is in response to increased aldosterone, increased AVP secretion & suppressed atrial natriuretic peptide secretion.

80

Normally, the BUN:creatinine ratio is about ?

Harrison's 17th Ed 276

- A. 5:1
- B. 10:1
- C. 15:1
- D. 20:1

Normally, the BUN:creatinine ratio is about 10:1.

81

An increased BUN:creatinine ratio may be due to ?

Harrison's 18th Ed 344

- A. Prerenal azotemia
- B. GI bleeding
- C. Glucocorticoid therapy
- D. All of the above

Increased BUN (relative to creatinine) may be due to prerenal azotemia, increased urea production as in hyperalimentation (high-protein), glucocorticoid therapy, and gastrointestinal bleeding.

Hyponatremia

82

Plasma sodium concentration falls by how much for every 100 mg/dL rise in plasma glucose concentration ?

Harrison's 17th Ed 277

- A. 1.2 mmol / L
- B. 1.4 mmol / L
- C. 1.6 mmol / L
- D. 1.8 mmol / L

Plasma Na⁺ falls by 1.4 mmol/L for every 100 mg/dL rise in plasma glucose concentration.

83

Urine tonicity is calculated by ?

Harrison's 17th Ed 277

- A. [Na⁺] + [K⁺] - [Cl⁻]
- B. [Na⁺] x [K⁺]
- C. [Na⁺] x [K⁺] ÷ [Cl⁻]
- D. [Na⁺] + [K⁺]

Urine tonicity is calculated as the sum of concentrations of Na⁺ and K⁺.

84

'Diuretic-induced hyponatremia' is almost always due to ?

Harrison's 18th Ed 344

- A. Thiazide diuretics
- B. Loop diuretics

- C. Aldosterone antagonists
- D. All of the above

Diuretic-induced hyponatremia is almost always due to thiazide diuretics which lead to Na⁺ & K⁺ depletion & AVP-mediated water retention. Loop diuretics decrease tonicity of medullary interstitium & impair maximal urinary concentrating capacity which limits ability of AVP to promote water retention.

85

'Syndrome of inappropriate antidiuretic hormone secretion' (SIADH) causes ?

Harrison's 18th Ed 345

- A. Normovolemic hyponatremia
- B. Hypovolemic hyponatremia
- C. Hypervolemic hyponatremia
- D. Any of the above

Syndrome of inappropriate antidiuretic hormone secretion (SIADH) is the most common cause of normovolemic or euvolemic hyponatremia.

86

Which of the following conditions can cause hyponatremia ?

Harrison's 18th Ed 345

- A. Hypothyroidism
- B. Hyperthyroidism
- C. Cushing's disease
- D. Pheochromocytoma

Adrenal insufficiency & hypothyroidism may cause hyponatremia. Hypothyroidism decreases cardiac output and GFR and thus increased AVP secretion leading to hyponatremia.

87

Renal excretory capacity is ?

Harrison's 17th Ed 277

- A. 12 liter / day
- B. 15 liter / day
- C. 18 liter / day
- D. 20 liter / day

Normally, renal excretory capacity is large of 12 liters per day.

88

'Osmotic diuresis' is defined as a solute excretion rate of more than ?

Harrison's 18th Ed 347

- A. ~ 250 mosmol/day
- B. ~ 450 mosmol/day
- C. ~ 550 mosmol/day
- D. ~ 750 mosmol/day

Osmotic diuresis refers to a solute excretion rate of > ~750 mosmol/day.

89

Phenomenon of 'hyponatremia' in beer drinkers is called ?

Harrison's 18th Ed 346

- A. Beer syndrome
- B. Beer flush
- C. Beer potomania
- D. Beer psychosis

Beer drinkers have poor dietary intake of protein & electrolytes & consume large volumes of beer, which may exceed renal excretory capacity and result in hyponatremia. This is referred to as beer potomania.

90

Stupor, seizures, and coma occur when plasma sodium concentration falls acutely below ?

Harrison's 17th Ed 277

- A. 123 mmol/L

- B. 122 mmol/L
- C. 121 mmol/L
- D. 120 mmol/L

Stupor, seizures & coma occur when plasma Na⁺ concentration falls acutely below 120 mmol/L.

91 The finding of urine sodium concentration >20 mmol/L in hypovolemic hyponatremia implies ?

Harrison's 18th Ed 348

- A. Salt-wasting nephropathy
- B. Diuretic therapy
- C. Hypoaldosteronism
- D. All of the above

Urine Na⁺ concentration >20 mmol/L in hypovolemic hyponatremia implies a salt-wasting nephropathy, diuretic therapy, hypoaldosteronism or vomiting.

92 Which of the following statements about SIADH is false ?

Harrison's 18th Ed 347

- A. Hypoosmotic hyponatremia
- B. Urine osmolality >100 mosmol/kg
- C. Hypervolemia
- D. Normal sodium balance

Patients with SIADH are usually euvolemic.

93 Which of the following statements about SIADH is false ?

Harrison's 18th Ed 347

- A. Normal renal, adrenal, and thyroid function
- B. Normal potassium and acid-base balance
- C. Hypouricemia
- D. None of the above

SIADH is characterized by hypoosmotic hyponatremia in the setting of an inappropriately concentrated urine (urine osmolality >100 mosmol/kg). Patients are typically normovolemic & have normal Na⁺ balance. They tend to be mildly volume-expanded secondary to water retention & have a urine Na⁺ excretion rate equal to intake (urine Na⁺ concentration usually >40 mmol/L). By definition, they have normal renal, adrenal & thyroid function & usually have normal K⁺ & acid-base balance. Hypouricemia in SIADH is due to uricosuric state induced by volume expansion. In contrast, hypovolemic patients tend to be hyperuricemic secondary to increased proximal urate reabsorption.

94 What percentage of increase in brain volume can be fatal ?

- A. 2% to 4%
- B. 4% to 6%
- C. 6% to 8%
- D. 8% to 10%

If plasma is dilute, water diffuses into brain by osmosis causing dilution of extracellular fluid in brain & swelling of brain cells. An increase in brain volume of 8% to 10% can be fatal. By cerebral osmoregulatory (adaptive) mechanism brain cells pump out myoinositol, glutamine, glycerophosphorylcholine, betaine, creatine & taurine to restore osmolality of cerebral ECF & limiting swelling of brain cells. Acute hyponatremia may cause cerebral edema due to underlying osmotic interactions between brain cells and the extracellular fluid compartment.

95 Physiologic functions of AVP include ?

Lancet 2008;371:1624-32

- A. Contraction of vascular smooth muscle
- B. Stimulation of liver glycogenolysis
- C. Regulation of corticotropin release
- D. All of the above

Physiologic functions of AVP or antidiuretic hormone include contraction of vascular smooth muscle, stimulation of liver glycogenolysis, regulation of corticotropin release and renal antidiuresis.

96 Inappropriately elevated levels of AVP are found in ?

Drugs. 2007;67(6):847-58

- A. Congestive heart failure
- B. Cirrhosis of liver
- C. SIADH
- D. All of the above

Inappropriately elevated levels of AVP occur in CHF, cirrhosis liver, treatment with diuretics & SIADH.

97 Which of the following is a arginine-vasopressin-receptor subtype ?

Lancet 2008;371:1624-32

- A. V1a
- B. V1b
- C. V2
- D. All of the above

Arginine vasopressin (AVP) is a neuropeptide hormone. Three arginine-vasopressin-receptor subtypes V1a, V1b, and V2 belong to the large rhodopsin-like G-protein-coupled receptor family. V1A & V1B receptors are linked to phosphoinositol signaling pathway, with intracellular calcium acting as the second messenger, whereas V2 receptors are linked to adenylate cyclase signaling pathway, with intracellular cyclic adenosine monophosphate (cAMP) acting as second messenger.

98 Non-peptide vasopressin receptor antagonists are called ?

Harrison's 18th Ed 349

- A. Captans
- B. Vaptans
- C. Naptans
- D. Saptans

Vaptans are orally & intravenously active non-peptide vasopressin receptor antagonists. AVP receptor antagonists induces free water diuresis without natriuresis or kaliuresis, an effect termed aquaresis.

99 V(1A) receptors located in ?

Lancet 2008;371:1624-32

- A. Vascular smooth muscle cells & myocardium
- B. Collecting tubules
- C. Anterior pituitary
- D. All of the above

100 V(2) receptors located in ?

Lancet 2008;371:1624-32

- A. Vascular smooth muscle cells & myocardium
- B. Collecting tubules
- C. Anterior pituitary
- D. All of the above

101 V(1B) receptors located in ?

Lancet 2008;371:1624-32

- A. Vascular smooth muscle cells & myocardium
- B. Collecting tubules
- C. Anterior pituitary
- D. All of the above

Activation of V(1A) receptors located in vascular smooth muscle cells & myocardium results in vasoconstriction & increased afterload & hypertrophy. V(2) receptors located in principal cells of renal-collecting-duct system & mediate free water absorption. V(1B) receptors are located in anterior pituitary & mediate adrenocorticotropin hormone release. Cardiovascular & renal effects of AVP are mediated primarily by V(1A) and V(2) receptors.

102 Which of the following is a combined V(1A) / V(2)-receptor antagonist ?

Lancet 2008;371:1624-32

- A. Mozavaptan
- B. Tolvaptan
- C. Conivaptan
- D. Lixivaptan

Conivaptan is a combined V(1A) / V(2)-receptor antagonist (non-selective) that induces diuresis as well as haemodynamic improvement.

103 Which of the following is a selective V(1A) receptor antagonist ?

Lancet 2008;371:1624-32

- A. Mozavaptan
- B. Tolvaptan
- C. Relcovaptan
- D. Lixivaptan

Relcovaptan is a selective V1a-receptor antagonist used in the treatment of Raynaud's disease, dysmenorrhoea, and tocolysis.

104 Which of the following is a V2-receptor antagonist ?

Lancet 2008;371:1624-32

- A. Mozavaptan
- B. Satavaptan
- C. Tolvaptan
- D. All of the above

V2-receptor antagonists - mozavaptan, lixivaptan, satavaptan & tolvaptan, induce a highly hypotonic diuresis without substantially affecting excretion of electrolytes (by contrast with effects of diuretics). These are effective in the treatment of euvolaemic & hypervolaemic hyponatraemia.

105 Which of the following is administered intravenously ?

Lancet 2008;371:1624-32

- A. Mozavaptan
- B. Tolvaptan
- C. Conivaptan
- D. Lixivaptan

Conivaptan is available for intravenous (IV) administration, whereas the other three agents are for oral administration.

106 Which of the following is a Benzodiazepine derivative ?

Lancet 2008;371:1624-32

- A. Mozavaptan
- B. Tolvaptan
- C. Conivaptan
- D. Lixivaptan

Tolvaptan, Mozavaptan & Conivaptan are benzazepine derivative, Satavaptan is N-arylsulfonyl oxindole derivative, Lixivaptan is a Benzodiazepine derivative.

107 Vaptans are metabolised by which of the following hepatic cytochrome enzymes ?

Lancet 2008;371:1624-32

- A. CYP2D6
- B. CYP2C9
- C. CYP3A4
- D. CYP2C19

108 Vaptans are excreted through ?

Lancet 2008;371:1624-32

- A. Urine
- B. Faeces
- C. Lungs
- D. All of the above

109 V2-receptor antagonists are contraindicated in which of the following conditions ?

Lancet 2008;371:1624-32

- A. Hypovolaemic hyponatraemia
- B. Euvolaemic hyponatraemia
- C. Hypervolaemic hyponatraemia
- D. None of the above

Conivaptan & other V2-receptor antagonists are contraindicated in patients with hypovolaemic hyponatraemia, since it is an aquaretic.

110 Blood tonicity associated with hyponatremia is ?

N Engl J Med 2000;342:1581

- A. Low
- B. Normal
- C. High
- D. Any of the above

Hyponatremia can be associated with low, normal, or high blood tonicity.

111 Which of the following about pseudohyponatremia is false ?

N Engl J Med 2000;342:1581, Harrison's 18th Ed 347

- A. Iso-osmolar & isotonic hyponatremia
- B. Severe hypertriglyceridemia or paraproteinemia
- C. Increase in solid phase of plasma
- D. None of the above

Pseudohyponatremia is a spurious form of iso-osmolar & isotonic hyponatremia when severe hypertriglyceridemia or paraproteinemia increases substantially the solid phase of plasma.

112 Sodium required to correct hyponatremia can be estimated by multiplying the deficit in plasma sodium concentration by ?

Harrison's 17th Ed 278

- A. Weight
- B. Height
- C. Total body water
- D. Urine output in liters

Quantity of Na⁺ required to increase plasma Na⁺ concentration by a given amount can be estimated by multiplying the deficit in plasma Na⁺ concentration by total body water.

113 Quantity of sodium in 0.9% (normal, isotonic) saline is ?

Harrison's 18th Ed 344

- A. 77 mEq/L
- B. 154 mEq/L
- C. 256 mEq/L
- D. 513 mEq/L

114 In hyponatremia, plasma Na⁺ concentration during the first 24 hours should not be more than ?

Harrison's 18th Ed 349

- A. 6 mmol/L
- B. 8 mmol/L

- C. 10 mmol/L
D. 12 mmol/L

In hyponatremia, plasma Na⁺ concentration during the first 24 hours should not be more than 12 mmol/L and less than 6 mmol/L/day thereafter.

115 In a 70 kg man, to raise plasma Na⁺ concentration from 110 to 120 mmol/L, what is the amount of Na⁺ required ?

Harrison's 18th Ed 349

- A. 420 mmol
B. 440 mmol
C. 460 mmol
D. 480 mmol

To raise plasma Na⁺ concentration from 110 to 120 mmol/L in a 70-kg man requires 420 mmol [(120 – 110) × 70 × 0.6] of Na⁺. Total body water is 50 & 60% of lean body weight in women or men respectively.

116 Osmotic demyelination syndrome (ODS) includes ?

Harrison's 18th Ed 347

- A. Flaccid paralysis
B. Dysarthria
C. Dysphagia
D. All of the above

If hyponatremia is corrected too rapidly, osmotic demyelination syndrome (ODS) develops which is characterized by flaccid paralysis, dysarthria and dysphagia (central pontine myelinolysis). Patients with chronic hyponatremia are most susceptible to development of ODS.

117 Risk factors for ODS include ?

Harrison's 18th Ed 347

- A. Rapid or overcorrection of hyponatremia
B. Prior cerebral anoxic injury
C. Hypokalemia
D. All of the above

Besides, rapid or overcorrection of hyponatremia, risk factors for ODS include prior cerebral anoxic injury, menstruating women, prepubescent children, hypokalemia, and malnutrition.

118 Which of the following is related to central pontine myelinolysis ?

Harrison's 17th Ed 278

- A. Cerebral oedema
B. Cerebral dehydration
C. Cerebral atrophy
D. None of the above

Acute brain dehydration produced by rapid correction disrupts the tight junctions of blood-brain barrier. Disruption of BBB results in an influx of activated complement into brain which is toxic to oligodendrocytes that produce and maintain myelin in CNS. Clinical symptoms of central pontine myelinolysis do not occur until a few days after rapid Na⁺ correction. The classic presentation is pseudobulbar palsy & spastic quadriparesis.

Hypernatremia

119 Hypernatremia is defined as a plasma sodium concentration more than ?

Harrison's 18th Ed 349

- A. 135 mmol/L
B. 140 mmol/L
C. 145 mmol/L
D. 150 mmol/L

Hypernatremia is defined as a plasma Na⁺ concentration >145 mmol/L.

120 Which of the following about hypernatremia is false ?

Harrison's 17th Ed 279

- A. State of iso-osmolality
B. Results in ICF volume contraction
C. Stimulates thirst
D. Excretion of minimum volume of maximally concentrated urine

Hypernatremia is a state of hyperosmolality.

121 Which of the following is not a secretory diarrhea ?

Harrison's 17th Ed 279

- A. Cholera
B. Carcinoid
C. Lactulose induced
D. VIPoma

122 Which of the following about diabetes insipidus is false ?

Harrison's 18th Ed 350

- A. CDI is characterized by impaired AVP secretion
B. NDI results from renal resistance to actions of AVP
C. Familial CDI is inherited as autosomal recessive
D. Familial CDI is due to mutation in propressophysin gene

Familial form of CDI is inherited as autosomal dominant and is attributed to mutations in propressophysin (AVP precursor) gene.

123 Which of the following about nephrogenic diabetes insipidus is false ?

Harrison's 18th Ed 350

- A. Congenital Nephrogenic diabetes insipidus (NDI) is X-linked recessive trait due to mutations in V2 receptor gene
B. Congenital Nephrogenic diabetes insipidus (NDI) may be due to mutation in autosomal aquaporin-2 gene
C. Lithium, hypercalcemia & hyperkalemia cause sporadic NDI
D. Pregnant women, in II or III trimester, may develop NDI due to excessive vasopressinase from placenta

Lithium, hypercalcemia and hypokalemia can cause sporadic NDI.

124 Major symptoms of hypernatremia are ?

Harrison's 18th Ed 350

- A. Cardiac
B. Neurologic
C. Respiratory
D. All of the above

Major symptoms of hypernatremia are neurologic like altered mental status, weakness, neuromuscular irritability, focal neurologic deficits & coma or seizures.

125 'Solute excretion rate' is ?

Harrison's 17th Ed 279

- A. Urine volume x Osmolality
B. Urine volume x Urine sodium
C. Urine volume x Urine potassium
D. Urine volume x Urine bicarbonate

The product of urine volume & osmolality is called solute excretion rate.

126 After administering 'desmopressin', urine osmolality should increase by how much in CDI ?

Harrison's 17th Ed 280

- A At least 10 %
- B. At least 25 %
- C. At least 35 %
- D. At least 50 %

127 After administering 'desmopressin', urine osmolality should increase by how much in NDI ?

Harrison's 17th Ed 280

- A At least 10%
- B. At least 25%
- C. At least 35%
- D. None of the above

CDI & NDI can be distinguished by administering AVP analogue desmopressin (10 µg intranasally) after careful water restriction. Urine osmolality should increase by at least 50% in CDI & will not change in NDI.

128 In hyponatremia due to water loss, water deficit should be corrected in which of the following ways ?

Harrison's 18th Ed 350

- A Rapidly
- B. Over 12 to 24 hours
- C. Over 24 to 36 hours
- D. Slowly over at least 48 to 72 hours

In hyponatremia due to water loss, water deficit should be corrected slowly over 48 - 72 hours.

129 Drugs that either stimulate AVP secretion or enhance its action on the kidney includes all except ?

Harrison's 18th Ed 346 Table 45-1

- A Chlorpropamide
- B. Clofibrate
- C. Carbamazepine
- D. Phenytoin

Drugs that either stimulate AVP secretion or enhance its action on kidney are chlorpropamide, clofibrate, carbamazepine and NSAIDs.

130 Which of the following drugs is useful in NDI patients who have to take lithium ?

Harrison's 18th Ed 350

- A Amiloride
- B. Chlorpropamide
- C. Clofibrate
- D. Carbamazepine

Amiloride is useful NDI patients who have to take lithium. Nephrotoxicity of lithium requires it to be taken up into collecting duct cells via amiloride-sensitive Na⁺ channel.

Hypokalemia

131 Normal plasma potassium concentration inside cells is about ?

Harrison's 17th Ed 280

- A 50 mmol/L
- B. 100 mmol/L
- C. 150 mmol/L
- D. 200 mmol/L

Normal plasma K⁺ concentration is 3.5 - 5.0 mmol/L, whereas that inside cells is about 150 mmol/L. <2% of total body K⁺ content (2500 - 4500 mmol) is in ECF.

132 Normally, ratio of ICF to ECF K⁺ concentration is ?

Harrison's 17th Ed 280

- A 28:1
- B. 38:1
- C. 48:1
- D. 58:1

Normally, ratio of ICF to ECF K⁺ concentration is 38:1 due to resting membrane potential and is crucial for normal neuromuscular function.

133 The basolateral Na-K ATPase pump actively transports potassium in & sodium out of the cell in a ratio of ?

Harrison's 17th Ed 280

- A 1 : 2
- B. 2 : 3
- C. 3 : 4
- D. 4 : 5

The basolateral Na⁺, K⁺-ATPase pump actively transports K⁺ in and Na⁺ out of the cell in a 2:3 ratio, and the passive outward diffusion of K⁺ is quantitatively the most important factor that generates the resting membrane potential.

134 K⁺ intake in an average western diet is ?

Harrison's 17th Ed 280

- A 10 - 40 mmol/day
- B. 40 - 120 mmol/day
- C. 120 - 350 mmol/day
- D. 350 - 550 mmol/day

K⁺ intake in an average western diet is 40 - 120 mmol/day, or approximately 1 mmol/kg per day, 90% of which is absorbed by the gastrointestinal tract.

135 Potassium delivery to distal nephron approximates ?

Harrison's 17th Ed 280

- A Dietary excess
- B. Dietary intake
- C. Dietary deficiency
- D. Daily requirement

K⁺ delivery to the distal nephron [DCT + cortical collecting duct (CCD)] approximates dietary intake.

136 All regulation of renal potassium excretion & total body potassium balance occurs in ?

Harrison's 17th Ed 280

- A Proximal convoluted tubule
- B. Loop of Henle
- C. Distal nephron
- D. All of the above

Virtually all regulation of renal K⁺ excretion & total body K⁺ balance occurs in distal nephron.

137 Aldosterone is secreted by zona glomerulosa cells of adrenal cortex in response to ?

Harrison's 17th Ed 280

- A High renin
- B. High angiotensin II
- C. Hyperkalemia
- D. All of the above

Aldosterone is secreted by the zona glomerulosa cells of the adrenal cortex in response to high renin and angiotensin II or hyperkalemia.

138 Hypokalemia is defined as a plasma potassium concentration of ?

Harrison's 18th Ed 351

- A < 3.5 mmol/L
- B < 3.6 mmol/L
- C < 3.7 mmol/L
- D < 3.8 mmol/L

Hypokalemia is defined as a plasma K⁺ concentration <3.6 mmol/L.

139 Which of the following is a cause of decreased potassium intake ?

Harrison's 17th Ed 281

- A Ingestion of excess carbohydrates
- B Ingestion of excess proteins
- C Ingestion of excess fats
- D Ingestion of clay (geophagia)

Ingestion of clay (geophagia) is a cause of decreased K⁺ intake as it binds dietary K⁺ & iron.

140 Hypokalemia is associated frequently with ?

Harrison's 18th Ed 352, Table 45-4

- A Metabolic acidosis
- B Metabolic alkalosis
- C Respiratory acidosis
- D Respiratory alkalosis

Metabolic alkalosis is associated with hypokalemia due to K⁺ redistribution as well as excessive renal K⁺ loss.

141 Which of the following is a cause of hypokalemia ?

Harrison's 17th Ed 281

- A Metabolic alkalosis
- B Treatment of DKA with insulin
- C Uncontrolled hyperglycemia
- D All of the above

142 Which of the following is a cause of hypokalemia ?

Harrison's 17th Ed 281

- A Patients of pernicious anemia treated with vitamin B12
- B Patients of neutropenia treated with GM-CSF
- C Massive transfusion with thawed washed RBCs
- D All of the above

Treatment of DKA with insulin causes hypokalemia due movement of K⁺ inside the cells with glucose like anabolic states. Uncontrolled hyperglycemia causes K⁺ depletion due to osmotic diuresis.

143 Which of the following is a cause of hypokalemia ?

Harrison's 17th Ed 281

- A Excessive sweating
- B Hyperaldosteronism
- C Laxative abuse
- D All of the above

144 Which of the following is the least likely cause of hypokalemia ?

Harrison's 17th Ed 281

- A Excessive sweating
- B Loss of gastric secretions

- C Laxative abuse
- D None of the above

K⁺ concentration of gastric fluid is only 5 - 10 mmol/L and is a less likely cause of hypokalemia.

145 Hypokalemia due to loss of gastric contents is due to ?

Harrison's 17th Ed 281

- A Volume depletion
- B Metabolic alkalosis
- C A+B
- D Neither A, nor B

Loss of gastric contents results in volume depletion & metabolic alkalosis, both promote kaliuresis.

146 Primary hyperaldosteronism is due to dysregulated aldosterone secretion by ?

Harrison's 17th Ed 281

- A Adrenal adenoma
- B Adrenal carcinoma
- C Adrenocortical hyperplasia
- D All of the above

Primary hyperaldosteronism is due to dysregulated aldosterone secretion by an adrenal adenoma (Conn's syndrome) or carcinoma or to adrenocortical hyperplasia.

147 Tumor that produce renin include ?

Harrison's 17th Ed 281

- A Renal cell carcinoma
- B Ovarian carcinoma
- C Wilms' tumor
- D All of the above

Renin-secreting tumors of juxtaglomerular apparatus, renal cell carcinoma, ovarian carcinoma, and Wilms' tumor produce renin.

148 'Syndrome of apparent mineralocorticoid excess' is due to deficiency of ?

Harrison's 17th Ed 281

- A 11 α -HSDH
- B 11 β -HSDH
- C 12 α -HSDH
- D 12 β -HSDH

Cortisol is converted to cortisone by 11 β -hydroxysteroid dehydrogenase (11 β -HSDH). 11 β -HSDH deficiency or suppression allows cortisol to bind to the aldosterone receptor & leads to syndrome of apparent mineralocorticoid excess.

149 Conditions that inhibit the activity of '11 β -HSDH' include ?

Harrison's 17th Ed 281

- A Glycyrrhetic acid in licorice
- B Chewing tobacco
- C Carbenoxolone
- D All of the above

Glycyrrhetic acid (in licorice), chewing tobacco & carbenoxolone inhibit activity of 11 β -HSDH.

150 Which of the following is false about 'Liddle's syndrome' ?

Harrison's 17th Ed 281

- A Autosomal dominant
- B Hypertension
- C Hypokalemic metabolic alkalosis

- D. Excess renin and aldosterone secretion

Liddle's syndrome is an autosomal dominant disease characterized by hypertension, hypokalemic metabolic alkalosis, renal K⁺ wasting & suppressed renin & aldosterone secretion.

151 Bartter's syndrome is characterized by ?

Harrison's 17th Ed 282

- A. Hypokalemia
- B. Metabolic alkalosis
- C. Hyperreninemic hyperaldosteronism
- D. All of the above

Bartter's syndrome is characterized by hypokalemia, metabolic alkalosis, hyperreninemic hyperaldosteronism secondary to ECF volume contraction & juxtaglomerular apparatus hyperplasia.

152 Which of the following laboratory abnormalities is seen only in chronic renal failure ?

Harrison's 16th Ed. 247

- A. Anemia
- B. Hypocalcemia
- C. Hyperphosphatemia
- D. Radiographic evidence of renal osteodystrophy

153 Which of the following is false regarding ECG changes of hypokalemia ?

Harrison's 17th Ed 282

- A. Delayed ventricular repolarization
- B. Do not correlate well with plasma K⁺ levels
- C. Prominent U wave
- D. Shortened QU interval

ECG changes of hypokalemia are due to delayed ventricular repolarization and do not correlate well with the plasma K⁺ concentration. Early changes include flattening or inversion of T wave, prominent U wave, ST-segment depression, and prolonged QU interval.

154 Which of the following ECG changes denote severe K⁺ depletion ?

Harrison's 17th Ed 282

- A. Prominent U wave
- B. Inversion of T wave
- C. Prolonged PR interval
- D. Prolonged QU interval

Severe K⁺ depletion may result in a prolonged PR interval, decreased voltage and widening of the QRS complex and ventricular arrhythmias.

155 Hypokalemia with minimal renal potassium excretion suggests that potassium loss is through ?

Harrison's 17th Ed 282

- A. Skin
- B. Gastrointestinal tract
- C. Diuretic use
- D. Any of the above

Hypokalemia with minimal renal K⁺ excretion (<15 mmol/day of K⁺ in urine) suggests that K⁺ was lost via the skin or gastrointestinal tract or that there is a remote history of vomiting or diuretic use.

156 Hypokalemia with Transtubular K⁺ concentration gradient (TTKG) greater than how much suggests renal K⁺ loss due to increased distal K⁺ secretion ?

Harrison's 17th Ed 282

- A. 1
- B. 2

- C. 3

- D. 4

TTKG is the ratio of K⁺ concentration in lumen of CCD ($[K^+]_{CCD}$) to that in peritubular capillaries or plasma ($[K^+]_a$). Hypokalemia with a TTKG >4 suggests renal K⁺ loss due to increased distal K⁺ secretion.

157 A decrement of 1 mmol/L in plasma potassium concentration may represent a total body potassium deficit of ?

Harrison's 17th Ed 283

- A. 20 to 40 mmol
- B. 50 to 100 mmol
- C. 100 to 200 mmol
- D. 200 to 400 mmol

A decrement of 1 mmol/L in plasma K⁺ concentration reflects total body K⁺ deficit of 200 - 400 mmol.

158 Plasma potassium levels of < 3 mmol/L require how much potassium to correct the deficit ?

Harrison's 17th Ed 283

- A. 100 mmol
- B. 200 mmol
- C. 400 mmol
- D. 600 mmol

Patients with plasma levels <3.0 mmol/L require >600 mmol of K⁺ to correct the deficit.

159 It is generally safer to correct hypokalemia via which route ?

Harrison's 17th Ed 283

- A. Oral
- B. Peripheral vein
- C. Central vein
- D. Per rectum

It is generally safer to correct hypokalemia via the oral route.

160 Which is the preparation of choice for correction of hypokalemia with metabolic alkalosis?

Harrison's 17th Ed 283

- A. Potassium chloride
- B. Potassium bicarbonate
- C. Potassium citrate
- D. None of the above

Potassium chloride is preferred for more rapid correction of hypokalemia and metabolic alkalosis. Potassium bicarbonate and citrate (metabolized to HCO₃⁻) tend to alkalize and is more appropriate for hypokalemia associated with chronic diarrhea or RTA.

161 Rate of IV infusion of potassium in severe hypokalemia should not exceed ?

Harrison's 17th Ed 283

- A. 20 mmol/hour
- B. 40 mmol/hour
- C. 60 mmol/hour
- D. 80 mmol/hour

Rate of K⁺ infusion should not exceed 20 mmol/hour unless paralysis or malignant ventricular arrhythmias are present.

162 Through a peripheral vein, maximum concentration of administered K⁺ should be no more than ?

Harrison's 17th Ed 283

- A. 20 mmol/L

- B. 40 mmol/L
- C. 60 mmol/L
- D. 80 mmol/L

The maximum concentration of administered K^+ should be no more than 40 mmol/L via a peripheral vein or 60 mmol/L via a central vein.

163 Ideally, for infusion KCl should be mixed in ?

Harrison's 17th Ed 283

- A. Normal saline
- B. Dextrose solutions
- C. Ringer solutions
- D. Any of the above

Ideally, KCl is mixed in normal saline as dextrose solutions may initially exacerbate hypokalemia due to insulin-mediated movement of K^+ into cells.

Hyperkalemia

164 Hyperkalemia is defined as a plasma K^+ concentration of ?

Harrison's 17th Ed 283

- A. > 4.5 mmol/L
- B. > 5.0 mmol/L
- C. > 5.5 mmol/L
- D. > 6.0 mmol/L

Hyperkalemia is defined as a plasma K^+ concentration >5.0 mmol/L

165 Pseudohyperkalemia can result from ?

Harrison's 17th Ed 283

- A. Prolonged use of tourniquet
- B. Hemolysis
- C. Marked leukocytosis
- D. All of the above

166 Pseudohyperkalemia can result from ?

Harrison's 17th Ed 283

- A. Intravascular hemolysis
- B. Tumor lysis syndrome
- C. Rhabdomyolysis
- D. All of the above

Pseudohyperkalemia refers to an artificially elevated "plasma" K^+ concentration due to K^+ movement out of cells on venipuncture in asymptomatic patient with no obvious underlying cause. Serum K^+ concentration is normal. Prolonged tourniquet use, hemolysis & marked leukocytosis or thrombocytosis contribute to its occurrence. Intravascular hemolysis, tumor lysis syndrome, and rhabdomyolysis all lead to K^+ release from cells as a result of tissue breakdown.

167 Which of the following regarding hyperkalemic periodic paralysis is false ?

Harrison's 17th Ed 283

- A. Autosomal dominant disorder
- B. Episodic weakness / paralysis precipitated by exercise
- C. Due to mutation in gene for skeletal muscle Na^+ channel
- D. None of the above

Hyperkalemic periodic paralysis is an autosomal dominant disorder characterized by episodic weakness or paralysis, precipitated by stimuli that normally lead to mild hyperkalemia (exercise). Genetic defect is due to mutation in gene for skeletal muscle Na^+ channel.

168 Hyporeninemic hypoaldosteronism is seen in ?

Harrison's 17th Ed 283

- A. Mild renal insufficiency
- B. Diabetic nephropathy
- C. Chronic tubulointerstitial disease
- D. All of the above

Hyporeninemic hypoaldosteronism is seen in mild renal insufficiency, diabetic nephropathy or chronic tubulointerstitial disease.

169 Patients at increased risk of ACE inhibitor induced hyperkalemia include all except ?

Harrison's 17th Ed 283

- A. Diabetes mellitus
- B. Decreased effective circulating arterial volume
- C. Unilateral renal artery stenosis
- D. Concurrent use of NSAIDs

ACE inhibitors block conversion of angiotensin I to II. Angiotensin receptor antagonists directly inhibit actions of angiotensin II on AT1 angiotensin II receptors and result in impaired aldosterone release. Patients at increased risk of ACE inhibitor or angiotensin receptor antagonist-induced hyperkalemia include those with diabetes mellitus, renal insufficiency, decreased effective circulating arterial volume, bilateral renal artery stenosis, or concurrent use of K^+ -sparing diuretics or NSAIDs.

170 Heparin can lead to severe hyperkalemia in patients with ?

Harrison's 17th Ed 283

- A. Diabetes mellitus
- B. Those receiving potassium sparing diuretics
- C. Those receiving ACE inhibitors
- D. All of the above

Heparin (UFH & LMWH) inhibits production of aldosterone by zona glomerulosa & can lead to severe hyperkalemia in those with renal disease, DM, on K^+ -sparing diuretics, ACE inhibitors or NSAIDs.

171 Pseudohypoaldosteronism is characterized by all except ?

Harrison's 17th Ed 283

- A. High renin & aldosterone levels
- B. End-organ resistance to aldosterone
- C. Renal sodium wasting
- D. Hypertension

172 Pseudohypoaldosteronism is characterized by all except ?

Harrison's 17th Ed 283

- A. Hyperkalemia
- B. Metabolic alkalosis
- C. Renal sodium wasting
- D. Hypotension

Pseudohypoaldosteronism is characterized by hyperkalemia, metabolic acidosis, renal Na^+ wasting, hypotension, high renin and aldosterone levels, and end-organ resistance to aldosterone.

173 Which of the following is a competitive mineralocorticoid antagonist ?

Harrison's 17th Ed 283

- A. Spironolactone
- B. Amiloride
- C. Triamterene
- D. All of the above

Spironolactone is a competitive mineralocorticoid antagonist. Amiloride and triamterene block the apical Na^+ channel of principal cell of kidney.

174 Which of the following blocks the apical sodium channel of principal cell ?

Harrison's 17th Ed 283

- A. Amiloride
- B. Trimethoprim
- C. Pentamidine
- D. All of the above

Trimethoprim & pentamidine impair K⁺ secretion by blocking distal nephron Na⁺ reabsorption.

175 Nephropathy associated with impaired potassium excretion include ?

Harrison's 17th Ed 283

- A. Drug-induced interstitial nephritis
- B. Lupus nephritis
- C. Sick cell disease
- D. All of the above

Nephropathies associated with impaired K⁺ excretion include drug-induced interstitial nephritis, lupus nephritis, sickle cell disease and diabetic nephropathy.

176 Gordon's syndrome includes all except ?

Harrison's 17th Ed 284

- A. Hyperkalemia
- B. Metabolic acidosis
- C. Normal GFR
- D. High renin

Gordon's syndrome is characterized by hyperkalemia, metabolic acidosis, normal GFR, volume-expansion with suppressed renin & aldosterone levels. It is refractory to kaliuretic effect of exogenous mineralocorticoids.

177 The earliest ECG change in hyperkalemia is ?

Harrison's 17th Ed 284

- A. Increased T-wave amplitude
- B. Prolonged PR interval
- C. Prolonged QRS duration
- D. Loss of P waves

178 Sine wave pattern seen in severe hyperkalemia is due to merging of ?

Harrison's 17th Ed 284

- A. P + QRS
- B. QRS + T
- C. P + QRS + T
- D. Any of the above

The earliest ECG changes in hyperkalemia include increased T-wave amplitude. More severe degrees result in prolonged PR interval and QRS duration, AV conduction delay and loss of P waves. Progressive widening of QRS complex and merging with T wave produces a sine wave pattern. The terminal event is ventricular fibrillation or asystole.

179 Severity of hyperkalemia is determined by ?

Harrison's 17th Ed 284

- A. Symptoms
- B. Plasma K⁺ concentration
- C. ECG abnormalities
- D. All of the above

Severity of hyperkalemia is determined by symptoms, plasma K⁺ & ECG abnormalities.

180 The appropriate renal response to hyperkalemia is to excrete how much of K⁺ daily ?

Harrison's 17th Ed 284

- A. At least 50 mmol
- B. At least 100 mmol
- C. At least 200 mmol
- D. At least 300 mmol

The appropriate renal response to hyperkalemia is to excrete at least 200 mmol of K⁺ daily.

181 Potentially fatal hyperkalemia occurs when plasma potassium concentration exceeds ?

Harrison's 17th Ed 284

- A. 5.5 mmol/L
- B. 6.5 mmol/L
- C. 7.5 mmol/L
- D. 8.5 mmol/L

Potentially fatal hyperkalemia rarely occurs unless plasma K⁺ concentration exceeds 7.5 mmol/L.

182 In severe hyperkalemia, 10 mL of 10% calcium gluconate should be infused over ?

Harrison's 17th Ed 284

- A. Half to 1 minute
- B. 1 to 2 minutes
- C. 2 to 3 minutes
- D. 5 to 10 minutes

IV Calcium gluconate decreases membrane excitability. Usual dose is 10 mL of a 10% solution infused over 2-3 minutes. Its effect is short-lived (30-60 min). Dose can be repeated if no change in ECG is seen after 5-10 minutes.

183 Which of the following is used for lowering potassium levels in severe hyperkalemia ?

Harrison's 17th Ed 284

- A. Insulin-glucose infusion
- B. Alkali therapy with IV NaHCO₃
- C. β₂ adrenergic agonists
- D. All of the above

184 Which of the following reduce plasma K⁺ levels by shifting K⁺ into cells ?

Harrison's 17th Ed 284

- A. Glucose - insulin therapy
- B. Alkali therapy with IV NaHCO₃
- C. Beta₂-adrenergic agonists
- D. All of the above

Alkali therapy with IV NaHCO₃ shifts K⁺ into cells. β₂-adrenergic agonists promote cellular uptake of K⁺.

185 Which of the following is false regarding sodium polystyrene sulfonate ?

Harrison's 17th Ed 284

- A. Anion-exchange resin
- B. One gram binds 1 mmol of K⁺ & releases 2-3 mmol of Na⁺
- C. Usual dose is 25-50 gram orally
- D. Can be administered as retention enema

Sodium polystyrene sulfonate is a cation-exchange resin that promotes the exchange of Na⁺ for K⁺ in the gastrointestinal tract. Each gram binds 1 mmol of K⁺ and releases 2-3 mmol of Na⁺. Usual dose is 25-50 grams in 100 mL of 20% sorbitol orally to prevent constipation. It can also be administered as a retention enema.

186 The most rapid & effective way of lowering plasma potassium concentration is ?

Harrison's 17th Ed 284

- A. Insulin-glucose infusion
- B. Calcium gluconate infusion
- C. Peritoneal dialysis
- D. Hemodialysis

The most rapid and effective way of lowering the plasma K⁺ concentration is hemodialysis. Peritoneal dialysis is only 15-20% as effective as hemodialysis.

187 Which of the following parameter is not required in calculating TTKG ?

- A. Serum Osmolality
- B. Urine Osmolality
- C. pH
- D. Serum K

To calculate following parameters are required : Serum Osmolality (mOsm/kg), Urine Osmolality (mOsm/kg), Serum K (mEq/L) and Urine K (mEq/L).

188 Formula for calculating Transtubular Potassium Gradient (TTKG) is ?

- A. $(P_{\text{Potassium}} \times U_{\text{Potassium}}) / (P_{\text{Osm}} \times U_{\text{Osm}})$
- B. $(P_{\text{Osm}} \times P_{\text{Potassium}}) / (U_{\text{Potassium}} \times U_{\text{Osm}})$
- C. $(P_{\text{Osm}} \times U_{\text{Potassium}}) / (P_{\text{Potassium}} \times U_{\text{Osm}})$
- D. $(P_{\text{Potassium}} \times U_{\text{Osm}}) / (P_{\text{Osm}} \times U_{\text{Potassium}})$

Correct formula for TTKG is $(P_{\text{Osm}} \times U_{\text{Potassium}}) / (P_{\text{Potassium}} \times U_{\text{Osm}})$. It is valid only when $U_{\text{Osm}} > 300$ & $U_{\text{Na}} > 25$.

189 TTKG in a normal person on a normal diet is ?

- A. 2 - 4
- B. 4 - 6
- C. 6 - 7
- D. 8 - 9

TTKG in a normal person on a normal diet is 8 - 9.

190 Which of the following statements is false ?

- A. Hypokalemia should result in a TTKG < 2
- B. Hyperkalemia should result in a TTKG > 10
- C. Hypokalemia not resulting in a TTKG < 2 suggests renal loss as cause
- D. Hyperkalemia not resulting in a TTKG > 10 suggests type I renal tubular acidosis

Hyperkalemia not resulting in a TTKG > 10 suggests type IV renal tubular acidosis

Hypercalcemia

191 Decrease in serum calcium leads to ?

Harrison's 17th Ed 285, Figure 47-1

- A. Increase in parathyroid hormone (PTH)
- B. Resorption of calcium from bone
- C. Stimulates renal 1,25(OH)₂D production
- D. All of the above

192 Which of the following is the action of PTH ?

Harrison's 17th Ed 285, Figure 47-1

- A. Increased tubular reabsorption of calcium by kidney
- B. Resorption of calcium from bone
- C. Stimulates renal 1,25(OH)₂D production
- D. All of the above

193 Excess PTH production not appropriately suppressed by increased serum calcium concentrations occurs in ?

Harrison's 17th Ed 285

- A. Hypercalcemia of malignancy
- B. Parathyroid adenoma
- C. Sarcoidosis
- D. Hyperthyroidism

Excess PTH production not appropriately suppressed by increased serum calcium concentrations occurs in primary neoplastic disorders of parathyroid glands like parathyroid adenomas, hyperplasia, or carcinoma.

194 Which of the following is related to familial hypocalciuric hypercalcemia (FHH) ?

Harrison's 17th Ed 285

- A. PTH-related peptide (PTHrP)
- B. 1,25(OH)₂D
- C. Calcium sensor receptor (CaSR) mutations
- D. Exogenous calcium overload

Inappropriate PTH secretion for existing level of serum calcium occurs with heterozygous inactivating calcium sensor receptor (CaSR) mutations, which impair extracellular calcium sensing by parathyroid glands and kidneys, resulting in familial hypocalciuric hypercalcemia (FHH).

195 Which of the following is related to PTH-related peptide (PTHrP) ?

Harrison's 17th Ed 285

- A. Hypercalcemia of malignancy
- B. Milk-alkali syndrome
- C. Familial hypocalciuric hypercalcemia (FHH)
- D. Sarcoidosis

Many solid tumors produce PTH-related peptide (PTHrP) which binds PTH receptor & mimicks effects of PTH on bone & kidney like PTHrP-mediated hypercalcemia of malignancy & suppression of PTH.

196 Enhanced conversion of 25(OH)D to 1,25(OH)₂D leading to hypercalcemia is related to ?

Harrison's 17th Ed 285

- A. Hypercalcemia of malignancy
- B. Milk-alkali syndrome
- C. Familial hypocalciuric hypercalcemia (FHH)
- D. Sarcoidosis

Hypercalcemia in sarcoidosis or lymphomas is caused by enhanced conversion of 25(OH)D to potent 1,25(OH)₂D that enhances intestinal calcium absorption resulting in hypercalcemia & suppressed PTH.

197 Hypercalcemia due to excess secretion of 1,25(OH)₂D occurs in which of the following ?

N Engl J Med 2005;352:373-9

- A. Breast cancer
- B. Squamous-cell cancer
- C. Ovarian cancer
- D. Lymphoma

Some lymphomas secrete the active form of vitamin D, 1,25-dihydroxyvitamin D (1,25(OH)₂D), causing hypercalcemia as a result of the combination of enhanced osteoclastic bone resorption and enhanced intestinal absorption of calcium.

198 Type of hypercalcemia associated with cancer is ?*N Engl J Med 2005;352:373-9*

- A. Local osteolytic hypercalcemia
- B. Humoral hypercalcemia of malignancy
- C. 1,25(OH)₂D-secreting lymphomas
- D. All of the above

In addition to the above three, ectopic hyperparathyroidism due to ectopic secretion of authentic PTH is a rare cause of hypercalcemia.

199 Hypercalcemia with suppressed PTH secretion in hyperthyroidism is due to ?*Harrison's 17th Ed 285*

- A. Enhanced intestinal calcium absorption
- B. Increased calcium mobilization from bone
- C. PTHrP-mediated hypercalcemia
- D. Increased parathyroid cell mass

Hyperthyroidism or osteolytic metastases directly increase calcium mobilization from bone leading to hypercalcemia with suppressed PTH secretion.

200 Serum levels of calcium in mild hypercalcemia are upto ?*Harrison's 17th Ed 285*

- A. 7 - 8.5 mg/dL
- B. 8 - 9.5 mg/dL
- C. 9 - 10.5 mg/dL
- D. 11 - 11.5 mg/dL

Serum levels of calcium in mild hypercalcemia is upto 11 - 11.5 mg/dL and is usually asymptomatic.

201 Serum levels of calcium in severe hypercalcemia is more than ?*N Engl J Med 2005;352:373-9*

- A. 11 mg/dL
- B. 12 mg/dL
- C. 13 mg/dL
- D. 14 mg/dL

Serum levels of calcium in severe hypercalcemia is > 14.0 mg/dL.

202 True hypercalcemia refers to ?*N Engl J Med 2005;352:373-9*

- A. Elevated serum level of total calcium
- B. Elevated serum level of nonionized calcium
- C. Elevated serum level of ionized calcium
- D. Any of the above

Elevated serum level of ionized calcium is true hypercalcemia.

203 Basic mechanism of true hypercalcemia is ?*N Engl J Med 2005;352:373-9*

- A. Enhanced osteoclastic bone resorption
- B. Enhanced renal tubular reabsorption of calcium
- C. Enhanced intestinal absorption of calcium
- D. All of the above

True hypercalcemia is due to enhanced osteoclastic bone resorption (in local osteolytic hypercalcemia, humoral hypercalcemia of malignancy (HHM), 1,25(OH)₂D secreting lymphomas, & ectopic hyperparathyroidism), enhanced renal tubular reabsorption of calcium (in HHM & ectopic hyperparathyroidism), and enhanced intestinal absorption of calcium (in 1,25(OH)₂D-secreting lymphomas & ectopic hyperparathyroidism).

204 Medication that may independently lead to hypercalcemia is ?*N Engl J Med 2005;352:373-9*

- A. Lithium
- B. Vitamin D
- C. Thiazides
- D. All of the above

Medications that independently lead to hypercalcemia are lithium, calcitriol, vitamin D & thiazides.

205 While treating hypercalcemia, serum phosphorus level should be kept in the range of ?*N Engl J Med 2005;352:373-9*

- A. 0.5 to 1.0 mg/dL
- B. 1.0 to 2.0 mg/dL
- C. 2.0 to 2.5 mg/dL
- D. 2.5 to 3.0 mg/dL

206 While treating hypercalcemia, calcium - phosphorus product should be kept ideally below ?*N Engl J Med 2005;352:373-9*

- A. 5
- B. 10
- C. 20
- D. 30

While treating hypercalcemia, serum phosphorus level should be kept in the range of 2.5 to 3.0 mg/dL and the calcium - phosphorus product below 40, ideally in the range of 30.

207 Which of the following occurs in acute severe hypercalcemia (>12-13 mg/dL) ?*Harrison's 17th Ed 286*

- A. Pancreatitis
- B. Peptic ulcer disease
- C. Nephrolithiasis
- D. All of the above

Severe acute hypercalcemia (>12-13 mg/dL) may result in lethargy, stupor, coma or pancreatitis.

208 ECG changes in hypercalcemia include all except ?*Harrison's 17th Ed 286*

- A. Bradycardia
- B. AV block
- C. Short QT interval
- D. Prolonged PR interval

ECG changes in hypercalcemia include bradycardia, AV block & short QT interval.

209 Changes in serum calcium is preferably monitored by which of the following in ECG ?*Harrison's 17th Ed 286*

- A. Heart rate
- B. QRS amplitude
- C. QT interval
- D. ST segment

Changes in serum calcium can be monitored by following the QT interval.

210 What percentage of serum total calcium is ionized ?*Harrison's 17th Ed 286*

- A. 10 %

- B. 25 %
- C. 50 %
- D. 80 %

~50% of total calcium is ionized & rest is bound principally to albumin.

211 With a decrease in serum albumin of 1.0 g/dL, what quantity should be added to serum total calcium ?

Harrison's 17th Ed 286

- A. 0.2 mg/dL
- B. 0.4 mg/dL
- C. 0.6 mg/dL
- D. 0.8 mg/dL

Serum albumin levels are determined to obtain "correct serum calcium". 0.8 mg/dL should be added to total calcium for every decrement in serum albumin of 1.0 g/dL below the reference value of 4.1 g/dL for albumin, and conversely for elevations in serum albumin.

212 Chronic hypercalcemia is most commonly caused by ?

Harrison's 17th Ed 286

- A. Medication use
- B. Primary hyperparathyroidism
- C. Underlying malignancy
- D. Sarcoidosis

Primary hyperparathyroidism is the most common cause of chronic hypercalcemia, followed by hypercalcemia due to an underlying malignancy.

213 Increases in PTH are often accompanied by ?

Harrison's 17th Ed 286

- A. Hypokalemia
- B. Hyperphosphatemia
- C. Hypophosphatemia
- D. Hyponatremia

Increases in PTH are often accompanied by hypophosphatemia.

214 Lab. findings in primary hyperparathyroidism include ?

Harrison's 17th Ed 286

- A. Elevated serum calcium
- B. Low serum phosphorus
- C. Increased PTH level
- D. All of the above

If PTH level is increased with elevated serum calcium & low phosphorus, diagnosis is almost always primary hyperparathyroidism.

215 In familial hypocalciuric hypercalcemia (FHH), calcium / creatinine clearance ratio is ?

Harrison's 17th Ed 286

- A. < 0.01
- B. < 0.05
- C. < 0.1
- D. < 0.2

Calcium/creatinine clearance ratio (urine calcium/serum calcium divided by urine creatinine/serum creatinine) of <0.01 is suggestive of FHH.

216 Which of the following statements is false ?

Harrison's 17th Ed 286, N Engl J Med 2005;352:373-9

- A. Normal serum calcium is 8.9 - 10.1 mg/dL
- B. Ectopic PTH secretion is extremely rare

- C. Hypercalcemia invariably leads to dehydration
- D. None of the above

Normally, plasma PTH level varies inversely with plasma calcium level. Ectopic secretion of authentic PTH is a rare cause of hypercalcemia, having been well documented in only eight patients to date.

217 Classic laboratory finding in milk alkali syndrome is ?

N Engl J Med 2008;358:1952-6

- A. Hypercalcemia
- B. Metabolic alkalosis
- C. Impaired renal function
- D. All of the above

Hypercalcemia, metabolic alkalosis & impaired renal function are classic laboratory findings in patients with milk alkali syndrome in those with excess oral intake of calcium and milk.

218 Initial therapy of significant hypercalcemia begins with ?

Harrison's 17th Ed 286

- A. Volume expansion with IV saline
- B. Zoledronic acid
- C. Calcitonin
- D. Glucocorticoids

Initial therapy of significant hypercalcemia begins with volume expansion with saline (200 - 500 ml/hour, depending on patient's cardiovascular status & renal function) as hypercalcemia invariably leads to dehydration. Saline itself is calciuretic. Loop diuretics should not be administered until after full hydration has been achieved. Thiazide diuretics should not be used as they stimulate renal calcium reabsorption.

219 Drug that inhibits bone resorption is ?

Harrison's 17th Ed 286

- A. Zoledronic acid
- B. Pamidronate
- C. Etidronate
- D. All of the above

Intravenous bisphosphonates are the best studied, safest and most effective agents for use in patients with hypercalcemia associated with cancer. They work by blocking osteoclastic bone resorption. Ibandronate and Clodronate are the other two besides the above three.

220 Glucocorticoids are the preferred therapy in hypercalcemia due to ?

Harrison's 17th Ed 286

- A. Malignancy
- B. Severe hyperparathyroidism
- C. Sarcoidosis
- D. Familial hypocalciuric hypercalcemia (FHH)

In patients with $1,25(\text{OH})_2\text{D}$ -mediated hypercalcemia, glucocorticoids are the preferred therapy, as they decrease $1,25(\text{OH})_2\text{D}$ production.

221 Pharmacologic therapy for hypercalcemia associated with cancer include ?

N Engl J Med 2005;352:373-9

- A. Mithramycin
- B. Calcitonin
- C. Gallium nitrate
- D. All of the above

222 Dose of Zoledronic acid is ?

Harrison's 17th Ed 286

- A. 2 mg IV infusion over 30-minutes

- B. 4 mg IV infusion over 30-minutes
- C. 6 mg IV infusion over 30-minutes
- D. 8 mg IV infusion over 30-minutes

223 Drugs that decreases 1,25(OH)₂D production is ?

Harrison's 17th Ed 286

- A. Ketoconazole
- B. Chloroquine
- C. Hydroxychloroquine
- D. All of the above

Other drugs, such as ketoconazole, chloroquine, and hydroxychloroquine, may decrease 1,25(OH)₂D production and are used occasionally.

Hypocalcemia

224 Main defense against hypocalcemia is ?

Harrison's 17th Ed 286

- A. Calcium
- B. Vitamin D
- C. PTH
- D. PTH-related peptide (PTHrP)

PTH is the main defense against hypocalcemia.

225 Degree of hypocalcemia is most in which of these disorders ?

Harrison's 17th Ed 286

- A. Hypoparathyroidism
- B. Vitamin D deficiency
- C. Impaired 1,25(OH)₂D production
- D. Vitamin D resistance

Degree of hypocalcemia is most in hypoparathyroidism.

226 Chvostek's sign is present in what percentage of normal individuals ?

Harrison's 17th Ed 287

- A. ~ 4 %
- B. ~ 6 %
- C. ~ 8 %
- D. ~ 10 %

Chvostek's sign i.e. twitching of circumoral muscles in response to tapping of facial nerve just anterior to the ear is present in ~10% of normal individuals.

227 For eliciting Trousseau's sign, BP cuff is inflated how much above patient's systolic blood pressure ?

Harrison's 17th Ed 287

- A. 5 mm Hg
- B. 10 mm Hg
- C. 15 mm Hg
- D. 20 mm Hg

Trousseau's sign refers to carpal spasm in hypocalcemia induced by inflation of a BP cuff to 20 mm Hg above patient's SBP for 3 minutes.

228 Which of the following is false about severe hypocalcemia ?

Harrison's 17th Ed 287

- A. Seizures

- B. Bronchospasm
- C. Laryngospasm
- D. Short QT interval

Severe hypocalcemia can induce seizures, carpopedal spasm, bronchospasm, laryngospasm, and prolongation of the QT interval.

229 Nutritional vitamin D deficiency is best assessed by ?

Harrison's 17th Ed 287

- A. Serum 25-hydroxyvitamin D levels
- B. Serum 1,25(OH)₂D levels
- C. Serum calcium levels
- D. Serum PTH levels

230 Vitamin D resistance is best assessed by ?

Harrison's 17th Ed 287

- A. Serum 25-hydroxyvitamin D levels
- B. Serum 1,25(OH)₂D levels
- C. Serum calcium levels
- D. Serum PTH levels

Nutritional vitamin D deficiency is best assessed by obtaining serum 25-hydroxyvitamin D levels, which reflect vitamin D stores. In renal insufficiency or suspected vitamin D resistance, serum 1,25(OH)₂D levels are informative.

Acidosis & Alkalosis

231 Systemic arterial pH is maintained between 7.35 & 7.45 by ?

Harrison's 17th Ed 287

- A. Central nervous system
- B. Respiratory system
- C. Kidney
- D. All of the above

Control of arterial CO₂ tension (Pa_{CO₂}) by central nervous and respiratory systems & control of plasma bicarbonate by kidneys stabilize arterial pH by excretion or retention of acid or alkali maintains systemic arterial pH between 7.35 & 7.45.

232 Henderson-Hasselbalch equation is used to determine ?

Harrison's 17th Ed 287

- A. PaCO₂
- B. PaO₂
- C. Systemic pH
- D. Anion gap

233 Henderson-Hasselbalch equation is ?

Harrison's 17th Ed 287

- A. $4.1 + \log (\text{HCO}_3^- / (\text{Pa}_{\text{CO}_2} \times 0.0301))$
- B. $5.1 + \log (\text{HCO}_3^- / (\text{Pa}_{\text{CO}_2} \times 0.0301))$
- C. $6.1 + \log (\text{HCO}_3^- / (\text{Pa}_{\text{CO}_2} \times 0.0301))$
- D. $7.1 + \log (\text{HCO}_3^- / (\text{Pa}_{\text{CO}_2} \times 0.0301))$

Henderson-Hasselbalch equation includes metabolic & respiratory components that regulate systemic pH.

234 Increases or decreases in Pa_{CO₂} represent derangements of ?

Harrison's 17th Ed 288

- A. Neural respiratory control
- B. Compensatory response to alteration in plasma [HCO₃⁻]

- C. A+B
D. None of the above

235 Which of the following statements is false ?

Harrison's 17th Ed 288

- A. Usual steady-state PaCO_2 is 60 mm Hg
B. CO_2 underexcretion produces hypercapnia
C. CO_2 overexcretion causes hypocapnia
D. PaCO_2 regulated primarily by neural respiratory factors

Usual steady-state Pa_{CO_2} is maintained at 40 mmHg.

236 Which of the following statements is false ?

Harrison's 16th Ed. 263

- A. Hypercapnia is the result of hypoventilation
B. Primary alteration of PaCO_2 evokes renal adaptation
C. PaCO_2 changes result from alteration in plasma $[\text{HCO}_3^-]$
D. None of the above

237 Kidneys regulate plasma $[\text{HCO}_3^-]$ by ?

Harrison's 17th Ed 288

- A. Reabsorption of filtered HCO_3^-
B. Formation of titratable acid
C. Excretion of NH_4^+ in urine
D. All of the above

238 Kidneys excrete how much HCO_3^- ions per day ?

Harrison's 17th Ed 288

- A. About 2000 mmol
B. About 3000 mmol
C. About 4000 mmol
D. About 5000 mmol

239 Kidneys excrete how much H^+ ions per day ?

Harrison's 17th Ed 288

- A. About 2000 mmol
B. About 3000 mmol
C. About 4000 mmol
D. About 5000 mmol

Kidney filters ~4000 mmol of HCO_3^- per day and to reabsorb this filtered load of HCO_3^- , renal tubules must secrete 4000 mmol of hydrogen ions.

240 Which part of nephron reabsorbs most of HCO_3^- ions ?

Harrison's 17th Ed 288

- A. Proximal convoluted tubule
B. Loop of Henle
C. Distal convoluted tubule
D. Collecting ducts

80 - 90% of HCO_3^- is reabsorbed in the proximal convoluted tubule of kidney.

241 NH_4^+ production & excretion are impaired in ?

Harrison's 17th Ed 288

- A. Chronic renal failure
B. Hyperkalemia
C. Renal tubular acidosis
D. All of the above

NH_4^+ production & excretion are impaired in chronic renal failure, hyperkalemia & renal tubular acidosis.

242 Normally, what quantity of H^+ is secreted daily by distal nephron ?

Harrison's 17th Ed 288

- A. 40 - 60 mmol
B. 60 - 80 mmol
C. 80 - 100 mmol
D. 100 - 120 mmol

Distal nephron reabsorbs remainder of filtered HCO_3^- and secretes 40 - 60 mmol/day of H^+ .

243 Secreted H^+ is represented in the urine as ?

Harrison's 17th Ed 288

- A. NH_4^+
B. Titratable acid
C. Titratable acid & NH_4^+
D. All of the above

Secreted H^+ is represented in urine as titratable acid and NH_4^+ .

244 Which of the following formula is correct ?

Harrison's 17th Ed 288

- A. $\text{PaCO}_2 = (1.3 \times [\text{HCO}_3^-]) + 8$
B. $\text{PaCO}_2 = (1.4 \times [\text{HCO}_3^-]) + 8$
C. $\text{PaCO}_2 = (1.5 \times [\text{HCO}_3^-]) + 8$
D. $\text{PaCO}_2 = (1.6 \times [\text{HCO}_3^-]) + 8$

245 In simple metabolic acidosis, PaCO_2 would decrease by how much for each mmol/L decrease in $[\text{HCO}_3^-]$?

Harrison's 17th Ed 288

- A. 1.25 mmHg
B. 1.50 mmHg
C. 1.75 mmHg
D. 2.00 mmHg

Degree of respiratory compensation in simple metabolic acidosis is predicted by $\text{Pa}_{\text{CO}_2} = (1.5 \times [\text{HCO}_3^-]) + 8 \pm 2$. Thus, Pa_{CO_2} decreases by 1.25 mm Hg for each mmol/L decrease in $[\text{HCO}_3^-]$. Values for $\text{Pa}_{\text{CO}_2} < 24$ or > 28 mmHg define a mixed disturbance (metabolic acidosis and respiratory alkalosis or metabolic alkalosis and respiratory acidosis, respectively).

246 Which of the following statements about mixed acid-base disorders is false ?

Harrison's 17th Ed 288

- A. Due to independently coexisting disorders
B. Relationship is not as compensatory responses
C. Can lead to dangerous extremes of pH
D. None of the above

Mixed acid-base disorders are due to independently coexisting disorders and not merely as compensatory responses. They can lead to dangerous extremes of pH.

247 In clinical laboratory, which of the following is calculated from the Henderson-Hasselbalch equation ?

Harrison's 17th Ed 288

- A. pH
B. Pa_{CO_2}
C. $[\text{HCO}_3^-]$
D. All of the above

In clinical laboratory, pH and Pa_{CO_2} are measured and $[\text{HCO}_3^-]$ is calculated from Henderson-Hasselbalch equation.

248 Anionic gap (AG) is calculated by ?*Harrison's 17th Ed 289*

- A. $AG = Na^+ + (Cl^- - HCO_3^-)$
- B. $AG = Na^+ - (Cl^- - HCO_3^-)$
- C. $AG = Na^+ + (Cl^- + HCO_3^-)$
- D. $AG = Na^+ - (Cl^- + HCO_3^-)$

AG represents unmeasured anions in plasma (normally 10 to 12 mmol/L) and is calculated as $AG = Na^+ - (Cl^- + HCO_3^-)$.

249 Anion gap represents "unmeasured" anions like ?*Harrison's 17th Ed 289*

- A. Anionic proteins (Albumin)
- B. Phosphate
- C. Sulfate
- D. All of the above

Unmeasured anions include anionic proteins, phosphate, sulfate, and organic anions. Unmeasured cations include calcium, magnesium & potassium.

250 Increase in AG is most often due to ?*Harrison's 17th Ed 289*

- A. Increase in unmeasured anions
- B. Increase in measured anions
- C. Decrease in unmeasured cations
- D. Decrease in measured cations

Increase in AG is most often due to increase in unmeasured anions and less commonly due to decrease in unmeasured cations (Ca^{++} , Mg^{++} , K^+).

251 A fall in serum albumin by 1 g/dL from the normal value (4.5 g/dL) decreases the anion gap by ?*Harrison's 17th Ed 289*

- A. 1.5 meq/L
- B. 2.0 meq/L
- C. 2.5 meq/L
- D. 3.0 meq/L

A fall in serum albumin by 1 g/dL from normal value (4.5 g/dL) decreases anion gap by 2.5 meq/L.

252 Metabolic acidosis can occur because of ?*Harrison's 17th Ed 290*

- A. Increase in endogenous acid production
- B. Loss of bicarbonate
- C. Accumulation of endogenous acids
- D. All of the above

Metabolic acidosis occurs due to an increase in endogenous acid production (lactate & ketoacids), loss of bicarbonate (diarrhea), or accumulation of endogenous acids (renal failure).

253 Metabolic acidosis has profound effect on which of the following systems ?*Harrison's 17th Ed 290*

- A. Respiratory
- B. Cardiac
- C. Nervous
- D. All of the above

Metabolic acidosis has profound effects on the respiratory, cardiac, and nervous systems.

254 Fall in blood pH is accompanied by ?*Harrison's 17th Ed 290*

- A. Increase in ventilation
- B. Peripheral arterial vasodilation
- C. Central venoconstriction
- D. All of the above

Fall in blood pH is accompanied by increase in tidal volume (Kussmaul respiration), peripheral arterial vasodilation & central venoconstriction.

255 Normal-AG metabolic acidosis is also called ?*Harrison's 17th Ed 290*

- A. Hyperchloremic acidosis
- B. Hypochloremic acidosis
- C. Hyperkalemic acidosis
- D. Hypokalemic acidosis

Clinical metabolic acidosis is of two types - high-AG and normal-AG (hyperchloremic acidosis).

256 Increment (Δ) in AG (ΔAG) is estimated by ?*Harrison's 17th Ed 290*

- A. Patient's AG x 10
- B. Patient's AG + 10
- C. Patient's AG – 10
- D. Patient's AG ÷ 10

Potential $[HCO_3^-]$ can be estimated from the increment (Δ) in the AG ($\Delta AG = \text{patient's AG} - 10$).

257 Which of the following acid anion in plasma is metabolizable ?*Harrison's 17th Ed 290*

- A. β -hydroxybutyrate
- B. Acetoacetate
- C. Lactate
- D. All of the above

Metabolizable acid anion in plasma are β -hydroxybutyrate, acetoacetate & lactate.

258 Shohl's solution is ?*Harrison's 17th Ed 290, 292*

- A. Neutral
- B. Acidic
- C. Alkaline
- D. Any of the above

259 Sodium salt in Shohl's solution is ?*Harrison's 17th Ed 290, 292*

- A. Chloride
- B. Citrate
- C. Bicarbonate
- D. Sulphate

260 In a pure AG severe metabolic acidosis, goal is to increase the $[HCO_3^-]$ to ?*Harrison's 17th Ed 290*

- A. 10 meq/L
- B. 15 meq/L
- C. 20 meq/L
- D. 25 meq/L

261 In a pure AG severe metabolic acidosis, goal is to increase the pH to ?

Harrison's 17th Ed 290

- A. 7.15
- B. 7.25
- C. 7.35
- D. 7.45

In severe acidosis i.e. pH < 7.20, goal is to increase $[HCO_3^-]$ to 10 meq/L and pH to 7.15 and not to increase these values to normal.

262 Which of the following can cause high anion-gap metabolic acidosis ?

Harrison's 17th Ed 290

- A. Lactic acidosis, ketoacidosis
- B. Renal failure
- C. Ingested toxins & their metabolites
- D. All of the above

263 Which of the following 'toxins' can cause high-anion-gap metabolic acidosis ?

Harrison's 17th Ed 290

- A. Ethylene glycol
- B. Methanol
- C. Salicylates
- D. All of the above

264 Which of the following 'ketoacidosis' producing states can cause high-anion-gap metabolic acidosis ?

Harrison's 17th Ed 290

- A. Diabetic ketoacidosis
- B. Alcoholic ketoacidosis
- C. Starvation ketoacidosis
- D. All of the above

265 Normal serum lactate level is ?

- A. 0.5 - 1.7 mmol/L
- B. 1.7 - 2.3 mmol/L
- C. 2.5 - 3.7 mmol/L
- D. 3.5 - 4.7 mmol/L

Normal serum lactate level is 0.5-1.7 mmol/L.

266 Type A lactic acidosis is due to all except ?

Harrison's 17th Ed 290

- A. Severe anemia
- B. Mitochondrial enzyme defects
- C. Diabetes mellitus
- D. Shock

267 Type B lactic acidosis is due to all except ?

Harrison's 17th Ed 290

- A. Renal failure
- B. Hepatic failure
- C. Circulatory failure
- D. Carbon monoxide poisoning

268 Which of the following can cause Type B lactic acidosis ?

Harrison's 17th Ed 290

- A. Biguanides
- B. Ethanol
- C. Methanol
- D. All of the above

269 Which of the following can cause Type B lactic acidosis ?

Harrison's 17th Ed 290

- A. Isoniazid
- B. AZT analogues
- C. Fructose
- D. All of the above

Increase in plasma L-lactate may be secondary to poor tissue perfusion (type A) - circulatory insufficiency (shock, cardiac failure), severe anemia, mitochondrial enzyme defects, and inhibitors (carbon monoxide, cyanide) or to aerobic disorders (type B) - malignancies, NRTI drugs, DM, renal or hepatic failure, thiamine deficiency, infections, seizures, or drugs/toxins (biguanides, ethanol, methanol, propylene glycol, isoniazid, and fructose).

270 The nitroprusside ketone reaction can detect ?

Harrison's 17th Ed 290

- A. Acetoacetic acid
- B. Beta-hydroxybutyrate
- C. A+B
- D. None of the above

Nitroprusside ketone reaction can detect acetoacetic acid but not Beta-hydroxybutyrate, so the degree of ketosis and ketonuria can be underestimated.

271 Which of the following about alcoholic ketoacidosis is false ?

Harrison's 17th Ed 290

- A. Occurs in chronic alcoholics when alcohol consumption is abruptly curtailed
- B. Associated with binge drinking, vomiting, starvation and volume depletion
- C. Glucagon levels are increased
- D. Growth hormone levels are decreased

272 Which of the following about alcoholic ketoacidosis is false ?

Harrison's 17th Ed 290

- A. Acidosis is because of elevated β -hydroxybutyrate
- B. Nitroprusside ketone reaction does not detect β -hydroxybutyrate
- C. Insulin levels are high
- D. Triglyceride levels are increased

Chronic alcoholics can develop ketoacidosis when alcohol consumption is abruptly curtailed and nutrition is poor. AKA is usually associated with binge drinking, vomiting, abdominal pain, starvation and volume depletion. Typically, insulin levels are low, and triglyceride, cortisol, glucagon and growth hormone levels are increased.

273 Which of the following is exacerbated by glucose infusion for treatment of AKA ?

Harrison's 17th Ed 291

- A. Hypophosphatemia
- B. Hypokalemia
- C. Hypomagnesemia
- D. All of the above

Hypophosphatemia may be exacerbated by glucose infusion. If severe, may induce rhabdomyolysis.

274 Plasma osmolality (P_{osm}) is calculated by ?*Harrison's 17th Ed 291*

- A. $P_{\text{osm}} = 2\text{Na}^+ + \text{Glucose (mmol/L)} + \text{Urea (mmol/L)}$
 B. $P_{\text{osm}} = 2\text{Na}^+ + \text{Glucose (mmol/L)} + \text{BUN (mmol/L)}$
 C. $P_{\text{osm}} = 2\text{Na}^+ + \text{Glucose (mmol/L)} + (3 \times \text{Albumin})$
 D. $P_{\text{osm}} = 2\text{Na}^+ + 3\text{Glucose (mmol/L)}$

Plasma osmolality (P_{osm}) = $2\text{Na}^+ + \text{Glucose (mmol/L)} + \text{BUN (mmol/L)}$, or
 $P_{\text{osm}} = 2\text{Na}^+ + \text{Glucose (mg/dL)}/18 + \text{BUN (mg/dL)}/2.8$.

275 Osmolar gap is calculated by ?*Harrison's 17th Ed 291*

- A. Calculated osmolality - measured osmolality
 B. $2\text{Na}^+ + \text{Glucose (mmol/L)} + (3 \times \text{Albumin})$
 C. $2\text{Na}^+ + 3\text{Glucose (mmol/L)}$
 D. $2\text{Na}^+ + \text{Glucose (mmol/L)} + \text{Urea (mmol/L)}$

Difference between calculated osmolality and measured osmolality is called osmolar gap and is proportional to concentration of unmeasured solute.

276 Unit of osmolality is ?

- A. mOsm/kg/ H_2O
 B. mOsm/kg/Plasma
 C. mOsm/kg/Serum
 D. mOsm/kg/Blood

Unit of osmolality is mOsm/kg/ H_2O .

277 Which of the following can cause an elevated osmolal gap ?*Harrison's 17th Ed 291*

- A. Ethylene glycol
 B. Methanol
 C. Isopropyl alcohol
 D. All of the above

Ethylene glycol, methanol and isopropyl alcohol cause an elevated osmolal gap. Ethylene glycol and methanol cause a high-AG acidosis.

278 Which of the following is a metabolite of ethylene glycol ?*Harrison's 17th Ed 291*

- A. Lactic acid
 B. Tricarboxylic acid
 C. Oxalic acid
 D. Hydrochloric acid

Ethylene glycol (used in antifreeze) causes metabolic acidosis and damage to CNS, heart, lungs and kidneys. Its metabolites are oxalic acid, glycolic acid, and other organic acids.

279 Under most physiologic conditions, osmotic pressure of blood is generated by ?*Harrison's 17th Ed 291*

- A. Sodium
 B. Urea
 C. Glucose
 D. All of the above

280 The chemical name of 'Fomepizole' is ?*Harrison's 17th Ed 291*

- A. 2-methylpyrazole
 B. 3-methylpyrazole

- C. 4-methylpyrazole
 D. 5-methylpyrazole

281 'Fomepizole' is a ?*Harrison's 17th Ed 291*

- A. Aldehyde dehydrogenase inhibitor
 B. Alcohol dehydrogenase inhibitor
 C. Ketone dehydrogenase inhibitor
 D. None of the above

Fomepizole or 4-methylpyrazole is an alcohol dehydrogenase inhibitor. It is used to treat Alcohol-induced acidosis in a IV loading dose of 7 mg/kg.

282 Which of the following about methanol is false ?*Harrison's 17th Ed 291*

- A. Also called 'wood alcohol'
 B. Has high molecular weight
 C. Metabolites include formaldehyde and formic acid
 D. Intoxication cause severe optic nerve damage

Methanol or wood alcohol causes metabolic acidosis. Its metabolites formaldehyde & formic acid cause optic nerve & CNS damage. It has a low molecular weight (32 Da).

283 Acidosis is not present in which of the following ?*Harrison's 17th Ed 291*

- A. Ethylene glycol ingestion
 B. Isopropyl alcohol ingestion
 C. Methanol ingestion
 D. Ketosis

In Isopropyl alcohol ingestion, acidosis is not present because acetone is rapidly excreted.

284 Which of the following about uremic acidosis is false ?*Harrison's 17th Ed 291*

- A. Reduced rate of NH_4^+ production and excretion
 B. $[\text{HCO}_3^-]$ levels rarely < 15 mmol/L
 C. Anion gap (AG) rarely > 20 mmol/L
 D. None of the above

Uremic acidosis is characterized by reduced rate of NH_4^+ production & excretion due to decreased renal mass. $[\text{HCO}_3^-]$ rarely falls to <15 mmol/L and AG is rarely >20 mmol/L.

285 'Extrarenal cause' of acidosis is suggested by ?*Harrison's 17th Ed 292*

- A. Negative urine anion gap (UAG)
 B. Positive urine anion gap
 C. Zero urine anion gap
 D. Any of the above

286 Urine anion gap (UAG) is calculated by the formula ?*Harrison's 17th Ed 292*

- A. $[\text{Na}^+ + \text{K}^+]_{\text{u}} / [\text{Cl}^-]_{\text{u}}$
 B. $[\text{Na}^+ + \text{K}^+]_{\text{u}} \times [\text{Cl}^-]_{\text{u}}$
 C. $[\text{Na}^+ + \text{K}^+]_{\text{u}} - [\text{Cl}^-]_{\text{u}}$
 D. $[\text{Na}^+ + \text{K}^+]_{\text{u}} + [\text{Cl}^-]_{\text{u}}$

Urinary NH_4^+ levels are estimated by urine anion gap (UAG) i.e. $[\text{Na}^+ + \text{K}^+]_{\text{u}} - [\text{Cl}^-]_{\text{u}}$. When $[\text{Cl}^-]_{\text{u}} > [\text{Na}^+ + \text{K}^+]_{\text{u}}$, the UAG is negative which indicates that urine ammonium level is appropriately increased, suggesting an extrarenal cause of the acidosis. When urine anion gap is positive, urine ammonium level is low, suggesting a renal cause of acidosis.

287 Fanconi syndrome is characterized by ?*Harrison's 17th Ed 292*

- A. Glycosuria
- B. Generalized aminoaciduria
- C. Phosphaturia
- D. All of the above

Fanconi syndrome refers to glycosuria, generalized aminoaciduria, and phosphaturia due to generalized proximal tubular dysfunction (type 2 RTA).

288 Typical findings in classic distal RTA (type 1 RTA) include ?*Harrison's 17th Ed 292*

- A. Hypokalemia
- B. Low urinary NH_4^+ excretion
- C. Urine pH > 5.5
- D. All of the above

289 The typical findings in classic distal RTA (type 1 RTA) include all except ?*Harrison's 17th Ed 292*

- A. Hyperkalemia
- B. Hyperchloremic acidosis
- C. Low urinary NH_4^+ excretion
- D. High urine pH

Typical findings of classic distal RTA (type 1 RTA) include hypokalemia, hyperchloremic acidosis, low urinary NH_4^+ excretion (positive UAG, low urine $[\text{NH}_4^+]$), and high urine pH (pH > 5.5).

290 Mnemonic "MUDPILES" is to remember cause of ?

- A. Metabolic acidosis
- B. Metabolic alkalosis
- C. Respiratory acidosis
- D. Respiratory alkalosis

Useful to memorize causes of anion gap metabolic acidemias. Letters in MUDPILES represent methanol, uremia, diabetic & alcoholic ketoacidosis, paraldehyde, isoniazid (INH), lactic acidemia, ethylene glycol toxicity, and salicylates. Paraldehyde can be replaced with propylene glycol.

291 Hyporeninemic hypoaldosteronism can be seen in ?*Harrison's 17th Ed 292*

- A. Diabetes mellitus
- B. Tubulointerstitial disease
- C. Renal insufficiency
- D. All of the above

Hyporeninemic hypoaldosteronism causes hyperchloremic metabolic acidosis, in older adults with diabetes mellitus or tubulointerstitial disease and renal insufficiency.

292 Metabolic alkalosis is manifested by all except ?*Harrison's 17th Ed 292*

- A. Elevated arterial pH
- B. Increase in serum $[\text{HCO}_3^-]$
- C. Hyperchloremia
- D. Increase in PaCO_2

Metabolic alkalosis manifests as elevated arterial pH, increased serum $[\text{HCO}_3^-]$ & increased PaCO_2 due to compensatory alveolar hypoventilation. It is often accompanied by hypochloremia & hypokalemia.

293 The PaCO_2 increases how much for each 10 mmol/L increase in $[\text{HCO}_3^-]$ above normal ?*Harrison's 16th Ed. 267*

- A. 2 mm Hg
- B. 4 mm Hg
- C. 6 mm Hg
- D. 8 mm Hg

294 Hypokalemia and alkalosis in a normotensive, nonedematous patient suggests ?*Harrison's 17th Ed 293*

- A. Magnesium deficiency
- B. Vomiting
- C. Diuretic ingestion
- D. All of the above

295 Hypokalemia and alkalosis in a normotensive, nonedematous patient suggests ?*Harrison's 17th Ed 293*

- A. Bartter's syndrome
- B. Gitelman's syndrome
- C. Exogenous alkali
- D. All of the above

Combination of hypokalemia & alkalosis in a normotensive, nonedematous patient can be due to Bartter's or Gitelman's syndrome, magnesium deficiency, vomiting, exogenous alkali, or diuretic ingestion.

296 Which of the following is true for urine in patients who are vomiting ?*Harrison's 17th Ed 293*

- A. Acidic urine, elevated $[\text{Na}]_u$ and $[\text{K}]_u$, low $[\text{Cl}]_u$
- B. Alkaline urine, low $[\text{Na}]_u$ and $[\text{K}]_u$, low $[\text{Cl}]_u$
- C. Acidic urine, low $[\text{Na}]_u$ and $[\text{K}]_u$, low $[\text{Cl}]_u$
- D. Alkaline urine, elevated $[\text{Na}]_u$ and $[\text{K}]_u$, low $[\text{Cl}]_u$

If urine is alkaline, with elevated $[\text{Na}^+]$ & $[\text{K}^+]$ but low $[\text{Cl}^-]$, diagnosis is either vomiting or alkali ingestion.

297 Acid urine with low urinary Na^+ , K^+ , and Cl^- suggest ?*Harrison's 17th Ed 293*

- A. Prior vomiting
- B. Posthypercapnic state
- C. Prior diuretic ingestion
- D. All of the above

If urine is acidic and has low concentrations of Na^+ , K^+ , and Cl^- , the possibilities are prior vomiting, posthypercapnic state, or prior diuretic ingestion.

298 Which of the following is false about Liddle's syndrome ?*Harrison's 17th Ed 294*

- A. Increased activity of collecting duct sodium channel
- B. Hypertension
- C. Hypokalemic alkalosis
- D. Elevated aldosterone levels

Liddle's syndrome results from increased activity of collecting duct Na^+ channel (ENaC) manifests as hypertension due to volume expansion leading to hypokalemic alkalosis & normal aldosterone levels.

299 Presentation of metabolic alkalosis is similar to ?*Harrison's 17th Ed 294*

- A. Hypercalcemia
- B. Hypocalcemia
- C. Hyperkalemia

D. All of the above

Changes in central and peripheral nervous system function with metabolic alkalosis are similar to those of hypocalcemia.

300 High urine chloride metabolic alkalemia includes ?

Disease-a-Month 2004;50:122-162

- A. Bartter syndrome
- B. Gitelman syndrome
- C. Liddle's syndrome
- D. All of the above

301 High urine chloride metabolic alkalemia with hypertension includes all except ?

Disease-a-Month 2004;50:122-162

- A. Conn's Syndrome
- B. Cushing disease
- C. Bartter's syndrome
- D. Liddle's syndrome

302 High urine chloride metabolic alkalemia without hypertension includes all except ?

Disease-a-Month 2004;50:122-162

- A. Excess bicarbonate administration
- B. Gitelman syndrome
- C. Bartter's syndrome
- D. Liddle's syndrome

303 In acute respiratory acidosis, $[\text{HCO}_3^-]$ levels increase by how much for every 10 mm Hg increase in PaCO_2 ?

Harrison's 17th Ed 294

- A. 1 mmol/L
- B. 2 mmol/L
- C. 3 mmol/L
- D. 4 mmol/L

304 In chronic respiratory acidosis, $[\text{HCO}_3^-]$ levels increase by how much for every 10 mm Hg increase in PaCO_2 ?

Harrison's 17th Ed 294

- A. 1 mmol/L
- B. 2 mmol/L
- C. 3 mmol/L
- D. 4 mmol/L

In acute respiratory acidosis, there is an increase of 1 mmol/L of HCO_3^- for every 10-mm Hg increase in PaCO_2 . In chronic respiratory acidosis (>24 hours), the $[\text{HCO}_3^-]$ increases by 4 mmol/L for every 10-mmHg increase in PaCO_2 .

305 In respiratory acidosis, serum HCO_3^- usually does not increase above ?

Harrison's 17th Ed 294

- A. 28 mmol/L
- B. 38 mmol/L
- C. 48 mmol/L
- D. 58 mmol/L

In respiratory acidosis, serum HCO_3^- usually does not increase above 38 mmol/L.

306 In respiratory acidosis, papilledema is due to ?

Harrison's 17th Ed 294

- A. Vasoconstriction
- B. Vasodilatation
- C. Hyperviscosity
- D. Renal failure

In respiratory acidosis, papilledema is due to vasoconstriction secondary to loss of the vasodilator effects of CO_2 .

307 Diagnosis of respiratory acidosis requires measurement of ?

Harrison's 17th Ed 295

- A. Pa_{CO_2}
- B. Pa_{O_2}
- C. $[\text{HCO}_3^-]$
- D. All of the above

Diagnosis of respiratory acidosis requires, by definition, measurement of Pa_{CO_2} & arterial pH.

308 In chronic respiratory alkalosis a 1-mm Hg fall in Pa_{CO_2} causes a drop in $[\text{HCO}_3^-]$ of ?

Harrison's 17th Ed 295

- A. 0.1 to 0.2 mmol/L
- B. 0.2 to 0.3 mmol/L
- C. 0.3 to 0.4 mmol/L
- D. 0.4 to 0.5 mmol/L

In chronic respiratory alkalosis a 1 mm Hg fall in Pa_{CO_2} causes a 0.4 to 0.5 mmol/L drop in $[\text{HCO}_3^-]$ and a 0.003 rise in pH.

309 $[\text{HCO}_3^-]$ falls by how much for each 10-mmHg decrease in Pa_{CO_2} in acute hypocapnia ?

Harrison's 17th Ed 295

- A. 2 mmol/L
- B. 3 mmol/L
- C. 4 mmol/L
- D. 5 mmol/L

310 $[\text{HCO}_3^-]$ falls by how much for each 10-mmHg decrease in Pa_{CO_2} in chronic hypocapnia ?

Harrison's 17th Ed 295

- A. 2 mmol/L
- B. 3 mmol/L
- C. 4 mmol/L
- D. 5 mmol/L

In acute hypocapnia, $[\text{HCO}_3^-]$ falls by 2 mmol/L and 4 mmol/L for each 10-mmHg decrease in Pa_{CO_2} in acute and chronic hypocapnia respectively.

311 In pure respiratory alkalosis, plasma HCO_3^- is usually more than ?

Harrison's 17th Ed 295

- A. 12 mmol/L
- B. 14 mmol/L
- C. 16 mmol/L
- D. 18 mmol/L

It is unusual to see a plasma $\text{HCO}_3^- < 12$ mmol/L due to pure respiratory alkalosis.

312 Which of the following shift inside the cell in acute respiratory alkalosis ?

Harrison's 17th Ed 295

- A. Na^+
- B. K^+

- C. PO_4^-
D. All of the above

Acute respiratory alkalosis causes intracellular shifts of Na^+ , K^+ , and PO_4^- . Hypocapnia-induced hypokalemia is usually minor.

313 Which of the following is an early finding in gram-negative septicemia ?

Harrison's 17th Ed. 295

- A. Fever
B. Hypoxemia
C. Respiratory alkalosis
D. Hypotension

Respiratory alkalosis is often an early finding in gram-negative septicemia, before fever, hypoxemia, or hypotension develops.

314 Most common acid-base disturbance in critically ill patients is ?

Harrison's 17th Ed. 295

- A. Acute respiratory acidosis
B. Acute respiratory alkalosis
C. Chronic respiratory acidosis
D. Chronic respiratory alkalosis

Chronic respiratory alkalosis is the most common acid-base disturbance in critically ill patients.

315 What is the anion gap in a patient if albumin is 2 gm/dL, Na^+ is 140 mEq/L, Cl^- is 100 mEq/L, and HCO_3^- is 20 mEq/L ?

Harrison's 16th Ed. 265

- A. 15
B. 20
C. 25
D. 30

316 Which of the following is an ineffective osmole ?

Harrison's 16th Ed. 252

- A. Inositol
B. Urea
C. Betaine
D. Glutamine

317 For each decrease in blood pH of 0.10, the plasma potassium rises by ?

Harrison's 16th Ed. 264

- A. 0.5 mmol/L
B. 0.6 mmol/L
C. 0.7 mmol/L
D. 0.8 mmol/L

318 Normal range of urine ammonia is ?

Harrison's 17th Ed. Table 7

- A. 10 - 30 meq/day
B. 30 - 50 meq/day
C. 50 - 100 meq/day
D. 100 - 150 meq/day

319 Normal range of urine creatinine is ?

Harrison's 17th Ed. Table 7

- A. 1.0 - 1.6 g/day

- B. 1.6 - 2.2 g/day
C. 2.2 - 2.6 g/day
D. 2.6 - 3.0 g/day

320 Normal range of urine potassium is ?

Harrison's 17th Ed. Table 7

- A. 5 - 25 meq/day
B. 25 - 100 meq/day
C. 100 - 200 meq/day
D. 200 - 300 meq/day

321 Normal range of urine sodium is ?

Harrison's 17th Ed. Table 7

- A. 10 - 60 meq/day
B. 60 - 100 meq/day
C. 100 - 260 meq/day
D. 260 - 460 meq/day

322 Normal range of urine uric acid is ?

Harrison's 17th Ed. Table 7

- A. 50 - 250 mg/day
B. 250 - 800 mg/day
C. 800 - 1800 mg/day
D. 1800 - 3000 mg/day

323 Normal range of urine urea nitrogen is ?

Harrison's 17th Ed. Table 7

- A. 6 - 17 g/day
B. 17 - 37 g/day
C. 37 - 57 g/day
D. 57 - 87 g/day

324 Normal range of urine osmolality is ?

Harrison's 16th Ed. Table A-5

- A. 50 - 150 mosmol/kg
B. 150 - 300 mosmol/kg
C. 300 - 900 mosmol/kg
D. 900 - 1500 mosmol/kg

Chapter 277. Cellular and Molecular Biology of the Kidney

325 In kidneys, number of different cell types found is about ?

Harrison's 18th Ed. 2280

- A. 10
B. 30
C. 50
D. 80

Kidney is one of the highly differentiated organs in body containing nearly 30 different cell types.

326 How many glomeruli does each kidney contain in a normal-birth-weight adult ?

Harrison's 18th Ed. 2280

- A. 100,000

- B. 400,000
- C. 900,000
- D. 1200,000

There are ~900,000 glomeruli in each kidney in normal-birth-weight adults.

327 Contractile actin-myosin fibers are found in which of the following tissues of kidney ?

Harrison's 18th Ed 2280

- A. Glomeruli
- B. Mesangial cells
- C. Renal interstitium
- D. All of the above

Glomerular capillaries are in the midst of a mesangial matrix and together form the Bowman's capsule. Mesangial cells contain contractile actin-myosin fibers to maintain structural integrity.

328 Which of the following about kidney structure is false ?

Harrison's 18th Ed 2281

- A. Majority of nephrons are cortical
- B. Majority of glomeruli located in mid-to-outer cortex
- C. Cortical nephrons perform most of glomerular filtration
- D. None of the above

329 Which of the following about kidney structure is false ?

Harrison's 18th Ed 2281

- A. Cortical nephrons have short loops of Henle
- B. Juxtamedullary nephrons have long loops of Henle
- C. Peritubular capillaries surrounding cortical nephrons are shared among adjacent nephrons
- D. None of the above

Majority of nephrons are cortical, with glomeruli located in mid-to-outer cortex. Cortical nephrons have short loops of Henle, whereas juxtamedullary nephrons have long loops of Henle. Peritubular capillaries surrounding cortical nephrons are shared among adjacent nephrons. Juxtamedullary nephrons use separate capillaries called vasa recta. Cortical nephrons perform most of the glomerular filtration & their afferent arterioles are larger than their respective efferent arterioles. Juxtamedullary nephrons create a hyperosmolar gradient that allows for production of concentrated urine.

330 Cortical nephron has how many capillary beds arranged in series ?

Harrison's 18th Ed 2281

- A. 1
- B. 2
- C. 3
- D. 4

Cortical nephron has two capillary beds arranged in series separated by efferent arteriole that regulates hydrostatic pressure in both capillary beds.

331 What percentage of renal plasma flow is filtered into Bowman's space ?

Harrison's 18th Ed 2281

- A. ~ 20 %
- B. ~ 45 %
- C. ~ 60 %
- D. ~ 80 %

~20% of the renal plasma flow is filtered into Bowman's space.

332 Driving force for glomerular filtration at efferent arteriole is ?

Harrison's 18th Ed 2281

- A. Zero
- B. 10
- C. 20
- D. 30

As the oncotic pressure rises along the length of the glomerular capillary, the driving force for filtration falls to zero before reaching the efferent arteriole.

333 Autoregulation of glomerular filtration is the result of ?

Harrison's 18th Ed 2281

- A. Autonomous vasoreactive reflex in afferent arteriole
- B. Tubuloglomerular feedback
- C. Angiotensin II mediated vasoconstriction of efferent arteriole
- D. All of the above

Autoregulation of glomerular filtration is the result of an autonomous vasoreactive (myogenic) reflex in the afferent arteriole, tubuloglomerular feedback, and angiotensin II mediated vasoconstriction of the efferent arteriole.

334 Which of the following is the first line of defense against fluctuations in renal blood flow in autoregulation of glomerular filtration ?

Harrison's 18th Ed 2281

- A. Myogenic reflex in afferent arteriole
- B. Tubuloglomerular feedback
- C. Angiotensin II mediated vasoconstriction of efferent arteriole
- D. None of the above

Myogenic reflex is a first line of defense against fluctuations in renal blood flow.

335 Tubuloglomerular feedback is mediated by ?

Harrison's 18th Ed 2281

- A. Juxtaglomerular apparatus
- B. Macula densa
- C. Granular cells in the wall of afferent arteriole
- D. All of the above

336 Macula densa is located in which of the following ?

Harrison's 18th Ed 2281

- A. Proximal tubule
- B. Thick ascending limb of the loop of Henle
- C. Distal tubule
- D. Collecting duct

Tubuloglomerular feedback is mediated by specialized cells in thick ascending limb of the loop of Henle called macula densa that act as sensors of solute concentration & flow of tubular fluid.

337 Which of the following blunts tubuloglomerular feedback ?

Harrison's 18th Ed 2282

- A. Angiotensin II
- B. Reactive oxygen species
- C. Nitric oxide
- D. Adenosine

Angiotensin II & reactive oxygen species enhance, while nitric oxide blunts tubuloglomerular feedback.

338 Juxtaglomerular apparatus is located in which of the following ?

Harrison's 18th Ed 2282

- A. Afferent arteriole

- B. Efferent arteriole
- C. Distal tubule
- D. Collecting duct

Juxtaglomerular apparatus is located within the wall of afferent arteriole near macula densa and its granular cells release renin.

339 Renin catalyzes the conversion of ?

Harrison's 18th Ed 2282

- A. Angiotensinogen to angiotensin I
- B. Angiotensin I to angiotensin II
- C. Angiotensin II to angiotensin III
- D. All of the above

Renin is a proteolytic enzyme that catalyzes conversion of angiotensinogen to angiotensin I.

340 Angiotensin-converting enzyme catalyzes conversion of ?

Harrison's 18th Ed 2282

- A. Angiotensinogen to angiotensin I
- B. Angiotensin I to angiotensin II
- C. Angiotensin II to angiotensin III
- D. All of the above

Angiotensin I is converted to angiotensin II by angiotensin-converting enzyme (ACE).

341 Leaky epithelia is present in ?

Harrison's 18th Ed 2282

- A. Proximal convoluted tubule
- B. Distal convoluted tubule
- C. Collecting duct
- D. All of the above

Proximal tubule contains leaky epithelia, whereas distal nephron segments, such as distal convoluted tubule & collecting duct contain tight epithelia with little water permeability.

342 Facilitated diffusion occurs through which of the following ?

Harrison's 18th Ed 2283

- A. Pumps
- B. Channels
- C. Transporters
- D. Co-transporters

Movement of solutes & water across cell membranes is made possible by pumps (active transport), channels (passive transport), transporters (facilitated diffusion), and co-transporters (secondary active transport).

343 Ion-translocating ATPases include ?

Harrison's 18th Ed 2283

- A. Na^+/K^+ -ATPase
- B. H^+ -ATPase
- C. Ca^{2+} -ATPase
- D. All of the above

Ion-translocating ATPases that mediate active transport ("pumps") are the ubiquitous Na^+/K^+ -ATPase, the H^+ -ATPases, and Ca^{2+} -ATPases.

344 Which of the following solute moves by simple diffusion or passive transport ?

Harrison's 18th Ed 2283

- A. K^+
- B. Na^+

- C. Cl^-
- D. All of the above

In kidney, movement by simple diffusion or passive transport occurs of water, K^+ , Na^+ , and Cl^- .

345 Carriers or uniporters are related to ?

Harrison's 18th Ed 2283

- A. Active transport
- B. Passive transport
- C. Facilitated diffusion
- D. Secondary active transport

346 Symporters or co-transporters, antiporters or exchangers are related to ?

Harrison's 18th Ed 2283

- A. Active transport
- B. Passive transport
- C. Facilitated diffusion
- D. Secondary active transport

Facilitated diffusion is a specialized type of passive transport mediated by simple transporters called carriers or uniporters. Many transporters operate by translocating two or more ions/solutes either in the same direction (symporters or co-transporters) or in opposite directions (antiporters or exchangers) across the cell membrane.

347 Which of the following statements is false ?

Harrison's 18th Ed 2287

- A. Aquaporin-1 present on apical & basolateral membranes
- B. Na^+/K^+ -ATPase pump is on basolateral membranes
- C. Filtered bicarbonate is converted to carbonic acid in lumen
- D. Carbonic acid diffuses into the cell

Carbonic acid is metabolized by brush border carbonic anhydrase to water and carbon dioxide. Dissolved carbon dioxide diffuses into the cell, where by cytoplasmic carbonic anhydrase reforms carbonic acid which dissociates into H^+ and bicarbonate anions. Bicarbonate exits the cell through a basolateral $\text{Na}^+/\text{HCO}_3^-$ co-transporter.

348 Which of the following drugs is not filtered at the glomerulus ?

Harrison's 18th Ed 2285

- A. Penicillins
- B. Cephalosporins
- C. Salicylates
- D. All of the above

Penicillins, cephalosporins, and salicylates are not filtered at the glomerulus and are secreted by proximal tubule by specific transporters.

349 Which of the following is not a major segment of loop of Henle ?

Harrison's 18th Ed 2285

- A. Descending thin limb
- B. Descending thick limb
- C. Ascending thin limb
- D. Ascending thick limb

Loop of Henle consists of 3 major segments - descending & ascending thin limb & ascending thick limb.

350 Site of action of loop diuretics is ?

Harrison's 18th Ed 2285

- A. Proximal convoluted tubule
- B. Loop of Henle
- C. Distal convoluted tubule

D. Collecting duct

Site of action of loop diuretics is loop of Henle.

351 Water-permeability is highest in ?

Harrison's 18th Ed 2285

- A. Descending thin limb
- B. Ascending thin limb
- C. Ascending thick limb
- D. Proximal convoluted tubule

Descending thin limb of loop of Henle is highly water-permeable due to dense expression of aquaporin-1 water channels. Water permeability is negligible in the ascending limb.

352 Which of the following is the primary target for loop diuretics ?

Harrison's 18th Ed 2285

- A. Na^+/Cl^- co-transporter
- B. $\text{Na}^+/\text{K}^+/\text{2Cl}^-$ co-transporter
- C. Na^+/K^+ -ATPase
- D. Apical Ca^{++} -selective channels (TRPV5)

The $\text{Na}^+/\text{K}^+/\text{2Cl}^-$ co-transporter is the primary target for loop diuretics.

353 Tubular concentration of K^+ is ?

Harrison's 18th Ed 2285

- A. ~ 2 meq/L
- B. ~ 4 meq/L
- C. ~ 6 meq/L
- D. ~ 8 meq/L

Tubular concentration of K^+ is similar to plasma i.e. about 4 meq/L.

354 Which of the following is an inherited disorder of the thick ascending limb ?

Harrison's 18th Ed 2285

- A. Gitelman's syndrome
- B. Bartter's syndrome
- C. Gordon's syndrome
- D. Liddle's syndrome

Bartter's syndrome is an inherited disorder of thick ascending limb. It leads to a salt-wasting renal disease with hypokalemia & metabolic alkalosis.

355 Loss-of-function mutations in which of the following can cause Bartter's syndrome ?

Harrison's 18th Ed 2285

- A. NKCC2
- B. KCNJ1
- C. CLCNKB
- D. Any of the above

Loss-of-function mutations in genes encoding components of $\text{Na}^+/\text{K}^+/\text{2Cl}^-$ co-transporter (NKCC2), apical K^+ channel (KCNJ1) or basolateral Cl^- channel (CLCNKB, BSND) can cause Bartter's syndrome.

356 Positive electrostatic charge in the lumen relative to interstitium is caused by ?

Harrison's 18th Ed 2285

- A. Mg^{2+} reabsorption
- B. Ca^{2+} reabsorption
- C. Potassium recycling

D. All of the above

Potassium recycling contributes to a positive electrostatic charge in lumen relative to the interstitium.

357 Which of the following is a transmembrane protein located within the tight junction complex ?

Harrison's 18th Ed 2285

- A. Hensin
- B. Paracellin-1
- C. Nedd4-2
- D. All of the above

Mutations in CLDN16 encoding paracellin-1, a transmembrane protein located within the tight junction complex, leads to familial hypomagnesemia with hypercalcuria and nephrocalcinosis.

358 A molecular complex of which of the following proteins is critical for Mg^{2+} reabsorption in thick ascending limb of Henle ?

Harrison's 18th Ed 2286

- A. TRPM1 and TRPM2
- B. TRPM3 and TRPM4
- C. TRPM5 and TRPM6
- D. TRPM6 and TRPM7

A molecular complex of TRPM6 and TRPM7 proteins is critical for Mg^{2+} reabsorption in the thick ascending limb of Henle.

359 "Countercurrent multiplication" leads to ?

Harrison's 18th Ed 2285

- A. Hypotonic medullary interstitium
- B. Hypertonic medullary interstitium
- C. Isotonic medullary interstitium
- D. Any of the above

Loop of Henle and vasa recta establishes a hypertonic medullary interstitium by phenomenon called countercurrent multiplication.

360 Loss-of-function mutations of SLC12A3 encoding the apical Na^+/Cl^- co-transporter cause ?

Harrison's 18th Ed 2285

- A. Gitelman's syndrome
- B. Bartter's syndrome
- C. Gordon's syndrome
- D. Liddle's syndrome

Loss-of-function mutations of SLC12A3 encoding the apical Na^+/Cl^- co-transporter cause Gitelman's syndrome - a salt-wasting disorder associated with hypokalemic alkalosis and hypocalciuria.

361 Mutations in genes encoding WNK kinases, WNK-1 & WNK-4 cause ?

Harrison's 18th Ed 2285

- A. Gitelman's syndrome
- B. Bartter's syndrome
- C. Gordon's syndrome
- D. Liddle's syndrome

Mutations in genes encoding WNK kinases, WNK-1 and WNK-4 cause pseudohypoaldosteronism type II or Gordon's syndrome characterized by familial hypertension with hyperkalemia.

362 Which of the following about principal cells of cortical collecting duct is false ?

Harrison's 18th Ed 2286

- A. Main Na^+ reabsorbing cells

- B. Site of action of aldosterone
- C. Site of action of K⁺-sparing diuretics
- D. None of the above

Principal cells are the main Na⁺ reabsorbing cells and the site of action of aldosterone, K⁺-sparing diuretics, and spironolactone.

363 Which of the following is true for type A intercalated cells of cortical collecting duct ?

Harrison's 18th Ed 2286

- A. Acid secretion & bicarbonate reabsorption
- B. Bicarbonate secretion & acid reabsorption
- C. Acid & bicarbonate secretion
- D. Acid & bicarbonate reabsorption

364 Which of the following is true for type B intercalated cells of cortical collecting duct ?

Harrison's 18th Ed 2286

- A. Acid secretion & bicarbonate reabsorption
- B. Bicarbonate secretion & acid reabsorption
- C. Acid & bicarbonate secretion
- D. Acid & bicarbonate reabsorption

Type A intercalated cells of cortical collecting duct mediate acid secretion and bicarbonate reabsorption. Type B intercalated cells mediate bicarbonate secretion and acid reabsorption.

365 Activating mutations occur in which of the following channels in Liddle's syndrome ?

Harrison's 18th Ed 2286

- A. Na⁺
- B. K⁺
- C. Cl⁻
- D. HCO₃⁻

366 All of the following are features of Liddle's syndrome except ?

Harrison's 18th Ed 2286

- A. Hypokalemia
- B. Hypernatremia
- C. Hypertension
- D. Metabolic alkalosis

In Liddle's syndrome, activating mutations occur in epithelial Na⁺ channel causing increase in Na⁺ reclamation that produces hypokalemia, hypertension, and metabolic alkalosis.

367 Extracellular protein hensen is best related to ?

Harrison's 18th Ed 2286

- A. Principal cells
- B. Intercalated cells
- C. Podocytes
- D. Mesangial cells

In acidemia, kidneys use type A intercalated cells to secrete excess H⁺ & generate more HCO₃⁻. In bicarbonate excess with alkalemia type B intercalated cells predominate. Extracellular protein 'hensen' mediates this adaptation.

368 Which of the following water channels "aquaporin" is not present in inner medullary collecting duct cells ?

Harrison's 18th Ed 2286

- A. Aquaporin-1
- B. Aquaporin-2
- C. Aquaporin-3

- D. Aquaporin-4

Inner medullary collecting duct cells have vasopressin-regulated water channels (aquaporin-2 on apical & aquaporin-3 & 4 on basolateral membrane). Aquaporin-1 water channels are densely expressed in descending thin limb of loop of Henle.

369 Which of the following aquaporin is not regulated by vasopressin in the collecting duct ?

Harrison's 18th Ed 2286

- A. Aquaporin 1
- B. Aquaporin 2
- C. Aquaporin 3
- D. Aquaporin 4

Aquaporin 1 is active in all water-permeable segments of proximal & distal tubules, while aquaporins 2, 3, and 4 are regulated by vasopressin in the collecting duct.

370 Which of the following is false about renal natriuretic peptide (urodilatin) ?

Harrison's 18th Ed 2286

- A. Secreted by renal tubular epithelia
- B. Interacts with apical receptors on inner medullary collecting duct cells
- C. Attenuates net Na⁺ reabsorption
- D. None of the above

371 Urodilatin resembles which of the following ?

Harrison's 18th Ed 2286

- A. Atrial natriuretic peptide
- B. Aldosterone
- C. Renin
- D. PGE₂

372 Which of the following TRPV channels is osmoreceptive ?

Harrison's 17th Ed 1747

- A. TRPV1⁺
- B. TRPV2⁺
- C. TRPV3⁺
- D. TRPV4⁺

Vanilloid receptors Transient receptor potential (TRPV) channels respond to changes in tonicity. TRPV4⁺ neuronal cells connected to supraoptic and paraventricular nuclei in hypothalamus are osmoreceptive. They modulate release of vasopressin by posterior lobe of the pituitary gland.

373 Aldosterone leads to which of the following in principal cells of the collecting duct ?

Harrison's 18th Ed 2288

- A. Increase activity of apical membrane Na⁺ channel
- B. Increase activity of apical membrane K⁺ channel
- C. Increase activity of basolateral Na⁺/K⁺-ATPase
- D. All of the above

Aldosterone binds to cytoplasmic mineralocorticoid receptors in principal cells of collecting duct & increases activity of apical membrane Na⁺ channel, apical membrane K⁺ channel & basolateral Na⁺/K⁺-ATPase.

374 Aldosterone mediates its effects by which of the following genes ?

Harrison's 18th Ed 2288

- A. SLC2A2
- B. CLCN5
- C. SGK1

D. CASR

Alldosterone mediates its effects in part by serum/glucocorticoid-induced kinase 1 (SGK1).

Chapter 278. Adaption of the Kidney to Renal Injury

375 Whose name is associated with intact nephron hypothesis ?

Harrison's 18th Ed 2289

- A. Herbert Lubowitz
- B. Neal Bricker
- C. Doris Rolf
- D. Fred Weisser

An exposition of the Intact Nephron Hypothesis was published by Bricker et. al. in American Journal of Medicine (1960). Dr. Bricker defined the "intact nephron hypothesis" that the number of functioning nephrons is reduced in chronic renal disease and that the remaining nephrons undergo adaptations that maintain renal homeostasis.

376 Who proposed the "Hyperfiltration hypothesis" ?

Harrison's 18th Ed 2289

- A. JL Olson
- B. Timothy W. Meyer
- C. HG Rennke
- D. Barry Brenner

Barry Brenner in his hyperfiltration hypothesis in 1982 demonstrated that alterations in glomerular hemodynamics associated with renal ablation are accompanied by structural lesions and suggest that sustained single nephron hyperfiltration (SNGFR) may have maladaptive consequences by damaging remnant glomeruli.

377 Bricker's trade-off hypothesis best relates to ?

Harrison's 18th Ed 2289

- A. Calcium
- B. Phosphorus
- C. PTH
- D. All of the above

Bricker's trade-off hypothesis in 1972 is based on the effects of uremia on the balance between calcium, phosphorus & PTH levels. Elevations in PTH that occur in CKD restore calcium & phosphorus levels but lead to hyperplasia of parathyroid gland & secondary hyperparathyroidism (trade-off).

378 Urine specific gravity of 1.010 equals how many mosmol/L of urine osmolality ?

Harrison's 18th Ed 2291

- A. 300
- B. 325
- C. 350
- D. 375

Urine specific gravity of 1.010 equals ~350 mosmol/L of urine osmolality.

379 Delta metabolic acidosis occurs when GFR falls below ?

Harrison's 18th Ed 2292

- A. 25 mL/minute
- B. 40 mL/minute
- C. 60 mL/minute
- D. 75 mL/minute

When GFR falls below 25 mL/minute, organic acids accumulate producing a delta metabolic acidosis.

Chapter 279 & 280. Acute Kidney Injury & Chronic Kidney Disease

380 "Azo" means ?

Harrison's 18th Ed 2294

- A. Urea
- B. Ammonia
- C. Nitrogen
- D. Waste

Word azotemia is derived from "azo" meaning nitrogen.

381 Term azotemia is used mostly for ?

Harrison's 17th Ed. 1752

- A. Prerenal ARF
- B. Intrinsic ARF
- C. Postrenal ARF
- D. All of the above

Prerenal acute renal failure is also called azotemia.

382 Which of the following about acute renal failure is false ?

Lancet 2005;365:417-430

- A. Abrupt & sustained decrease in renal function with retention of nitrogenous and non-nitrogenous waste products
- B. Acute & sustained increase in serum creatinine of 0.5 mg/dL, if the baseline is < 2.5 mg/dL
- C. Increase in serum creatinine of > 20% if the baseline is > 2.5 mg/dL
- D. None of the above

383 RIFLE system is used to classify ?

Lancet 2005;365:417-430

- A. Acute renal failure
- B. Chronic renal failure
- C. Glomerulonephritis
- D. Nephrotic syndrome

384 Which of the following about prerenal azotaemia is false ?

Lancet 2005;365:417-430

- A. Integrity of renal tissue is disturbed
- B. Appropriate physiological response to renal hypoperfusion
- C. Certain drugs can provoke acute prerenal failure
- D. Persistent renal hypoperfusion leads to ischaemic ATN

385 Typical histological features of human acute tubular necrosis include ?

Lancet 2005;365:417-430

- A. Loss of brush border in proximal tubular cells
- B. Sloughing of tubular cells into the lumen
- C. Interstitial oedema
- D. All of the above

386 In kidneys, most of the blood supply is directed to ?

Lancet 2005;365:417-430

- A. Renal cortex

- B. Outer medulla
C. Medullary rays
D. None of the above
- 387 In established acute tubular necrosis, selective reduction in blood supply occurs in ?**
Lancet 2005;365:417-430
A. Renal cortex
B. Outer medulla
C. Medullary rays
D. None of the above
- 388 Vasoconstrictors implicated in reduced renal blood flow in acute tubular necrosis are ?**
Lancet 2005;365:417-430
A. Angiotensin II
B. Thromboxane A₂
C. Prostaglandin H₂
D. All of the above
- 389 Vasoconstrictors implicated in the reduced renal blood flow in acute tubular necrosis are ?**
Lancet 2005;365:417-430
A. Leukotrienes C4 and D4
B. Endothelin 1
C. Adenosine
D. All of the above
- 390 Which of the following about urine findings in pre-renal ARF is false ?**
Lancet 2005;365:417-430
A. Specific gravity about 1.020
B. Urine osmolality > 500
C. Fractional excretion of sodium (%) < 1
D. Fractional excretion of urea (%) > 35
- 391 Which of the following about urine findings in pre-renal ARF is false ?**
Lancet 2005;365:417-430
A. Urine sodium < 10 mmol/L
B. Urine osmolality > 500
C. Fractional excretion of sodium (%) > 2
D. Fractional excretion of urea (%) < 35
- 392 Which of the following about urine findings in pre-renal ARF is false ?**
Lancet 2005;365:417-430
A. Fractional excretion of uric acid (%) < 7
B. Fractional excretion of Lithium (%) < 7
C. Low brush border enzyme levels
D. None of the above
- 393 Which of the following about urine findings in renal ARF is false ?**
Lancet 2005;365:417-430
A. Specific gravity about 1.010
B. Urine osmolality > 300
C. Fractional excretion of sodium (%) > 2
D. Fractional excretion of urea (%) < 35
- 394 Which of the following about urine findings in renal ARF is false ?**
Lancet 2005;365:417-430
A. Urine sodium > 20 mmol/kg
B. Urine osmolality > 300
C. Fractional excretion of sodium (%) < 1
D. Fractional excretion of urea (%) > 35
- 395 Which of the following about urine findings in renal ARF is false ?**
Lancet 2005;365:417-430
A. Fractional excretion of uric acid (%) > 15
B. Fractional excretion of Lithium (%) > 20
C. High brush border enzyme levels
D. None of the above
- 396 Biomarkers proposed for the early diagnosis of acute renal failure include ?**
Lancet 2005;365:417-430
A. Urinary interleukin 18
B. Intestinal form of alkaline phosphatase
C. N-acetyl-β-glucosaminidase & alanine aminopeptidase
D. All of the above
- 397 Biomarkers specifically higher in ischaemic ATN is ?**
Lancet 2005;365:417-430
A. Urinary interleukin 18
B. Kidney injury molecule 1
C. N-acetyl-β-glucosaminidase
D. Alanine aminopeptidase
- 398 Agents that impair autoregulation of renal blood flow include ?**
Lancet 2005;365:417-430
A. NSAIDs
B. ACE inhibitors
C. Angiotensin-II-receptor blockers
D. All of the above
- 399 Oliguria is defined as ?**
Harrison's 18th Ed. 2301
A. Urine output < 100 mL/day with ECF overload
B. Urine output < 200 mL/day with ECF overload
C. Urine output < 300 mL/day with ECF overload
D. Urine output < 400 mL/day with ECF overload
-
- Oliguria is defined as urine output of <400 mL/day contributing to extracellular fluid overload.*
-
- 400 Acute tubular necrosis (ATN) relates best with ?**
Harrison's 17th Ed. 1752
A. Prerenal ARF
B. Intrinsic ARF
C. Postrenal ARF
D. All of the above
-
- More severe or prolonged prerenal ARF (renal hypoperfusion) may lead to ischemic injury of kidneys leading to acute tubular necrosis (ATN).*
-

401 Prerenal ARF can complicate which of the following ?*Harrison's 18th Ed. 2294*

- A. Low cardiac output
- B. Systemic vasodilatation
- C. Selective intrarenal vasoconstriction
- D. All of the above

Prerenal ARF can complicate any disease that induces hypovolemia, low cardiac output, systemic vasodilatation or selective intrarenal vasoconstriction.

402 Hypovolemia leads to activation of ?*Harrison's 17th Ed. 1753*

- A. Sympathetic nervous system
- B. Renin-angiotensin-aldosterone system
- C. Release of arginine vasopressin
- D. All of the above

Hypovolemia triggers neurohormonal responses that include activation of the sympathetic nervous system and renin-angiotensin-aldosterone system, and release of arginine vasopressin.

403 Which of the following is an action of Angiotensin II ?*Harrison's 17th Ed. 1753*

- A. Increased biosynthesis of Prostaglandin E_2
- B. Increased biosynthesis of prostacyclin
- C. Preferential constriction of efferent arterioles
- D. All of the above

Angiotensin II increases biosynthesis of vasodilator prostaglandins (Pg E_2 & prostacyclin) resulting in afferent arteriolar vasodilation. Angiotensin II also induces preferential constriction of efferent arterioles.

404 Which of the following drugs cause impairment of renal autoregulatory responses ?*Harrison's 17th Ed. 1753 Table 273-1*

- A. Nonsteroidal anti-inflammatory drugs
- B. Angiotensin-converting enzyme inhibitors
- C. Angiotensin II receptor blockers
- D. All of the above

Impairment of renal autoregulatory responses is caused by COX inhibitors (NSAID's), ACE inhibitors & angiotensin II receptor blockers.

405 Hepatorenal syndrome (HRS) is a form of ?*Harrison's 17th Ed 1753*

- A. Prerenal ARF
- B. Intrinsic ARF
- C. Intratubular obstruction
- D. Postrenal ARF

Hepatorenal syndrome (HRS) is a unique form of prerenal ARF.

406 Which of the following is false about hepatorenal syndrome ?*Harrison's 17th Ed 1753*

- A. Kidneys are structurally normal
- B. Kidneys fail due to intense renal vasoconstriction
- C. Type I HRS is the more aggressive form
- D. None of the above

407 Which of the following leads to intrinsic ARF ?*Harrison's 17th Ed 1754*

- A. Ischemic or nephrotoxic tubular injury
- B. Tubulointerstitial diseases

C. Diseases of renal microcirculation & glomeruli

D. All of the above

Intrinsic causes of ARF can be ischemic or nephrotoxic tubular injury, tubulointerstitial diseases, diseases of renal microcirculation & glomeruli and diseases of larger renal vessels.

408 Ischemic renal injury is most prominent in ?*Harrison's 17th Ed 1754*

- A. S_1 segment of proximal tubule
- B. S_2 segment of proximal tubule
- C. S_3 segment of proximal tubule
- D. Cortical thick ascending limb of loop of Henle

Ischemic renal injury is most prominent in S_3 segment of PCT and in medullary portion of the thick ascending limb of the loop of Henle.

409 Urine output is lowest in which of the following phases of ischemic ATN ?*Harrison's 17th Ed 1754*

- A. Initiation
- B. Extension
- C. Maintenance
- D. Recovery

During maintenance phase that lasts for 1 - 2 weeks, urine output is lowest due to reduced GFR and uremic complications may appear.

410 Diuretic phase occurs in which of the following phases of ischemic ATN ?*Harrison's 17th Ed 1754*

- A. Initiation
- B. Extension
- C. Maintenance
- D. Recovery

Diuresis occurs in the recovery phase.

411 Which of the following cause kidney injury through intrarenal vasoconstriction ?*Harrison's 17th Ed 1755*

- A. Radiocontrast agents
- B. Cyclosporine
- C. Tacrolimus
- D. All of the above

Radiocontrast agents (cyclosporine & tacrolimus) cause kidney injury through intrarenal vasoconstriction.

412 Endogenous nephrotoxins include all except ?*Harrison's 17th Ed 1755*

- A. Calcium
- B. Magnesium
- C. Urate
- D. Oxalate

413 Which of the following is an endogenous nephrotoxin ?*Harrison's 17th Ed 1755*

- A. Myoglobin
- B. Hemoglobin
- C. Myeloma light chains
- D. All of the above

Endogenous nephrotoxins include calcium, myoglobin, hemoglobin, urate, oxalate & myeloma light chains.

414 Increased serum LDH is found in which of the following causes of acute renal failure ?

Harrison's 17th Ed. 1756 Table 273-2

- A. Renal artery thrombosis
- B. HUS / TTP
- C. Hemolysis
- D. All of the above

Increased serum LDH is found in acute renal failure due to renal artery, HUS / TTP, thrombosis, hemolysis, acute urate nephropathy & tumor lysis syndrome.

415 Eosinophilia is found in which of the following causes of acute renal failure ?

Harrison's 17th Ed. 1756 Table 273-2

- A. Renal artery thrombosis
- B. HUS / TTP
- C. Hemolysis
- D. Atheroembolic disease

416 Hypocomplementemia is found in which of the following causes of acute renal failure ?

Harrison's 17th Ed. 1756 Table 273-2

- A. Renal artery thrombosis
- B. Ethylene glycol ingestion
- C. Multiple myeloma
- D. Atheroembolic disease

417 Tamm-Horsfall protein is secreted by epithelial cells of ?

Harrison's 17th Ed. 1756

- A. Proximal convoluted tubule
- B. Loop of Henle
- C. Distal convoluted tubule
- D. All of the above

Tamm-Horsfall protein is secreted by epithelial cells of the loop of Henle.

418 Pigmented "muddy brown" granular cast is characteristic of ?

Harrison's 17th Ed. 1758

- A. Prerenal ARF
- B. Ischemic or nephrotoxic ATN
- C. Postrenal ARF
- D. All of the above

Pigmented "muddy brown" granular cast is characteristic of ATN due to ischemic or nephrotoxic etiology.

419 Broad granular casts are characteristic of ?

Harrison's 17th Ed. 1758

- A. Glomerular injury
- B. Acute tubulointerstitial nephritis
- C. Ischemic or nephrotoxic ATN
- D. Chronic kidney disease

Broad granular casts are characteristic of chronic kidney disease.

420 Oxalate crystal is best related with ?

Harrison's 17th Ed. 1758

- A. Envelope-shaped
- B. Needle-shaped
- C. Round-shaped

D. Elliptical-shaped

421 Hippurate crystal is best related with ?

Harrison's 17th Ed. 1758

- A. Envelope-shaped
- B. Needle-shaped
- C. Round-shaped
- D. Elliptical-shaped

Ethylene glycol toxicity causes oxalate (envelope-shaped) & hippurate (needle-shaped) crystals.

422 Urine is strongly positive for heme by dipstick in ?

Harrison's 17th Ed. 1758

- A. Hemoglobinuria
- B. Hematuria
- C. Myoglobinuria
- D. All of the above

Urine is strongly positive for heme by dipstick in hemoglobinuria, hematuria & myoglobinuria.

423 Fractional excretion of sodium (FE_{Na}) is calculated as ?

Lancet 2005;365:417-430

- A. $[(\text{urine sodium} \times \text{plasma sodium}) \div (\text{plasma creatinine} \times \text{urine creatinine})] \times 100$
- B. $[(\text{urine creatinine} \times \text{plasma creatinine}) \div (\text{plasma sodium} \times \text{urine sodium})] \times 100$
- C. $[(\text{urine sodium} \times \text{urine creatinine}) \div (\text{plasma sodium} \times \text{plasma creatinine})] \times 100$
- D. $[(\text{urine sodium} \times \text{plasma creatinine}) \div (\text{plasma sodium} \times \text{urine creatinine})] \times 100$

FE_{Na} relates sodium clearance to creatinine clearance. Patients with prerenal ARF typically have a FE_{Na} of <1.0%. FE_{Na} may be >1.0% in prerenal ARF if patients are on diuretics or with preexisting CKD, salt-wasting syndromes or adrenal insufficiency.

424 Presence of which of the following suggests a diagnosis of acute renal failure due to rhabdomyolysis ?

Harrison's 17th Ed. 1758

- A. Hyperkalemia
- B. Hyperphosphatemia
- C. Hypocalcemia
- D. All of the above

Hyperkalemia, hyperphosphatemia, hypocalcemia, hyperuricemia and raised creatine kinase (MM isoenzyme) suggest a diagnosis of rhabdomyolysis.

425 In acute renal failure, severe anemia in the absence of hemorrhage suggests ?

Harrison's 17th Ed. 1758

- A. Hemolysis
- B. Multiple myeloma
- C. Thrombotic microangiopathy
- D. Any of the above

In acute renal failure, severe anemia in the absence of hemorrhage suggests hemolysis, multiple myeloma, or thrombotic microangiopathy.

426 In acute renal failure, systemic eosinophilia suggests ?

Harrison's 17th Ed. 1758

- A. Allergic interstitial nephritis
- B. Atheroembolic disease

- C. Polyarteritis nodosa
- D. Any of the above

In acute renal failure, systemic eosinophilia suggests allergic interstitial nephritis, atheroembolic disease or polyarteritis nodosa.

427 Acute renal failure impairs which of the following ?

Harrison's 17th Ed. 1758

- A. Renal excretion of sodium, potassium & water
- B. Divalent cation homeostasis
- C. Urinary acidification mechanisms
- D. All of the above

ARF impairs renal excretion of sodium, potassium, and water and perturbs divalent cation homeostasis and urinary acidification mechanisms.

428 Which of the following is not a feature of acute renal failure ?

Harrison's 17th Ed. 1758

- A. Hyperphosphatemia
- B. Hypocalcemia
- C. Hypomagnesemia
- D. Metabolic acidosis

ARF is complicated by hyponatremia, hyperkalemia, hyperphosphatemia, hypocalcemia, hypermagnesemia and metabolic acidosis.

429 Hyperkalemia in acute renal failure is severe in ?

Harrison's 17th Ed. 1759

- A. Rhabdomyolysis
- B. Hemolysis
- C. Tumor lysis syndrome
- D. All of the above

Hyperkalemia in acute renal failure may be severe in patients with rhabdomyolysis, hemolysis, and tumor lysis syndrome.

430 Which of the following can occur during recovery phase of ARF ?

Harrison's 17th Ed. 1759

- A. Hypernatremia
- B. Hypokalemia
- C. Hypophosphatemia
- D. All of the above

Vigorous diuresis during recovery phase of ARF may lead to intravascular volume depletion causing hypernatremia, hypokalemia, hypomagnesemia, hypophosphatemia and hypocalcemia.

431 Cockcroft - Gault equation is used for estimation of ?

Harrison's 17th Ed. 1759

- A. Urinary anion gap
- B. Serum anion gap
- C. Glomerular filtration rate (GFR)
- D. Fractional excretion of sodium

432 Modification of Diet in Renal Disease (MDRD) equation is used for estimation of ?

Harrison's 17th Ed. 1759

- A. Urinary anion gap
- B. Serum anion gap
- C. Glomerular filtration rate (GFR)
- D. Fractional excretion of sodium

433 Which of the following may prevent or attenuate ARF ?

Harrison's 17th Ed. 1759

- A. Allopurinol
- B. Forced alkaline diuresis
- C. Rasburicase
- D. All of the above

Allopurinol, forced alkaline diuresis, Rasburicase, N-acetylcysteine help in preventing development of ARF due to various causes.

434 Which of the following is an oral phosphate binder ?

Harrison's 17th Ed. 1760

- A. Calcium carbonate
- B. Sevelamer
- C. Aluminum hydroxide
- D. All of the above

Hyperphosphatemia can be controlled by oral phosphate binders like calcium carbonate, calcium acetate, sevelamer & aluminum hydroxide.

435 Uremic bleeding may respond to administration of ?

Harrison's 17th Ed. 1761

- A. Desmopressin
- B. Estrogens
- C. Dialysis
- D. All of the above

Uremic bleeding may respond to desmopressin, estrogens or dialysis.

436 In acute renal failure, mortality is high when there is ?

Lancet 2005;365:417-430

- A. Multiorgan failure
- B. High concentration of TNF- α
- C. Low production of interleukin 10
- D. All of the above

437 Absolute indication for dialysis in ARF is ?

Harrison's 17th Ed. 1761

- A. Uremic syndrome
- B. Hyperkalemia
- C. Acidosis
- D. All of the above

Absolute indications for dialysis are symptoms or signs of uremic syndrome, refractory hypervolemia, hyperkalemia, or acidosis.

438 Classic pathologic features of ischemic ATN include ?

Harrison's 17th Ed. 1755

- A. Patchy & focal necrosis of tubular epithelium
- B. Normal glomeruli
- C. Normal renal vasculature
- D. All of the above

Classic pathologic features of ischemic ATN are patchy & focal necrosis of the tubular epithelium, detachment of cells from basement membrane and occlusion of tubule lumens. Glomeruli & renal vasculature is characteristically normal.

439 Which of the following suggests chronic kidney disease ?

Harrison's 17th Ed. 1755

- A. Anemia
- B. Evidence of renal osteodystrophy

- C. Small scarred kidneys
- D. All of the above

Findings that suggest chronic kidney disease include anemia, evidence of renal osteodystrophy (radiologic or laboratory) and small scarred kidneys.

440 Kidney size may be increased in which of the following chronic renal diseases ?

Harrison's 17th Ed. 1755

- A. Diabetic nephropathy
- B. Amyloidosis
- C. HIV associated nephropathy
- D. All of the above

Kidney size may be normal or increased in diabetic nephropathy, amyloidosis, polycystic kidney disease and HIV associated nephropathy.

441 A persistent reduction in GFR to less than what level per minute per 1.73 m² is defined as chronic kidney disease ?

Harrison's 16th. Ed. 1653

- A. 60 ml
- B. 70 ml
- C. 80 ml
- D. 90 ml

442 In a case of CRF, oral acetylcysteine with hydration significantly lowers the risk of ?

Lancet 2005;365:417-430

- A. Contrast nephropathy
- B. Uremic pericarditis
- C. Uremic encephalopathy
- D. All of the above

443 Most rapid way to remove potassium in severe hyperkalemia is ?

Lancet 2005;365:417-430

- A. Intravenous calcium
- B. Infusion of glucose & insulin
- C. Na-K exchange resin (sodium polystyrene sulfonate)
- D. Haemodialysis

444 Decreased GFR occurs due to ?

Harrison's 16th Ed. 1639

- A. Reduced Glomerular hydraulic pressure
- B. Elevated Bowman's space hydraulic pressure
- C. Rise in Plasma colloid osmotic pressure
- D. All of the above

445 Decreased GFR occurs due to ?

Harrison's 16th Ed. 1639

- A. Reduced Glomerular blood flow
- B. Reduced Glomerular Permeability
- C. Diminished Filtration surface area
- D. All of the above

446 The molecular weight of inulin is about ?

Harrison's 16th Ed. 1639

- A. 4800
- B. 5000

- C. 5200
- D. 5400

Molecular weight of inulin is ~5200. It pass freely across glomerular filtration barrier, appearing at approximately the same concentration in Bowman's space as in plasma.

447 Which of the following is curve A-type solute ?

Harrison's 16th Ed 1640

- A. Sodium
- B. Urate
- C. Urea
- D. All of the above

Curve A-type solutes include urea and creatinine. These depend largely on glomerular filtration for urinary excretion. Their secretion contributes little to overall excretion. The clinical course of CRF usually also approximates curve A.

448 Which of the following are curve B-type solutes ?

Harrison's 16th Ed 1640

- A. Phosphate (PO₄³⁻)
- B. Urate
- C. Potassium & Hydrogen ions
- D. All of the above

449 Which of the following is not a curve B-type solute ?

Harrison's 16th Ed 1640

- A. Sodium
- B. Potassium
- C. Hydrogen
- D. None of the above

450 Which of the following is a curve C-type solute ?

Harrison's 16th Ed 1640

- A. Sodium
- B. Potassium
- C. Hydrogen
- D. Urate

In contrast to solutes of the curve A type, plasma levels of phosphate, urate, and potassium and hydrogen ions usually do not rise until the GFR falls to a small percentage of normal. With progressive renal failure this pattern of response (curve B) reflects the participation of tubule transport mechanisms in the excretion of these substances.

451 Plasma concentration of which of the following remains normal throughout the course of CRF ?

Harrison's 16th Ed 1640

- A. Potassium
- B. Sodium
- C. Calcium
- D. Hydrogen

For sodium chloride (NaCl), plasma concentrations remain normal throughout the course of CRF, despite unrestricted intake of these substances (curve C).

452 Site where AVP exerts its principal effect is ?

Harrison's 16th Ed 1641

- A. Proximal convoluted tubule
- B. Loop of Henle
- C. Distal convoluted tubule
- D. Cortical & papillary portions of collecting duct

453 What proportion of glomerular ultrafiltrate is reabsorbed in the proximal tubules ?

Harrison's 16th Ed 1640

- A. One third
- B. One half
- C. Two third
- D. Three fourth

~ Two-thirds of glomerular ultrafiltrate is reabsorbed isosmotically in proximal tubule with little change in osmolality or sodium concentration of unreabsorbed fraction. With water absorption, sodium along with chloride & bicarbonate are absorbed actively to keep ultrafiltrate iso-osmotic.

454 In earliest portion of proximal tubule, which of the following is the principal ion that accompanies the reabsorption of sodium ?

Harrison's 16th Ed 1640

- A. Chloride
- B. Bicarbonate
- C. Hydrogen
- D. Phosphate

In the earliest portion of PCT, bicarbonate is the principal anion that accompanies reabsorption of sodium. This process occurs via a Na/H exchanger at the luminal brush border and is dependent on the activity of carbonic anhydrase.

455 Early proximal convoluted tubule is the major site of reabsorption of ?

Harrison's 16th Ed 1640

- A. Lactate
- B. Amino acids
- C. Glucose
- D. All of the above

Glucose, amino acids, and organic solutes like lactate are extensively reabsorbed in the proximal tubule by cotransport mechanisms.

456 Normally, in glomerulus, which of the following is true ?

Harrison's 16th Ed 1641

- A. Hydraulic pressure exceeds oncotic pressure
- B. Oncotic pressure exceeds hydraulic pressure
- C. Oncotic pressure equals hydraulic pressure
- D. Any of the above

At glomerulus, hydraulic pressure exceeds oncotic pressure favoring filtration.

457 Site of action of loop diuretics is ?

Harrison's 16th. Ed. 1641

- A. Proximal convoluted tubule
- B. Thin ascending limb of Henle's loop
- C. Medullary thick ascending limb of Henle
- D. All of the above

Na:K:2Cl cotransporter is the site of action of the powerful loop diuretics in the medullary thick ascending limb of Henle, and its mutations give rise to Bartter's syndrome.

458 Normally, major quantity of phosphate is reabsorbed in ?

Harrison's 16th Ed 1641

- A. Proximal convoluted tubule
- B. Loop of Henle
- C. Distal convoluted tubule
- D. Collecting duct

459 The principle site of action of Parathyroid hormone (PTH) is ?

Harrison's 16th Ed 1642

- A. Proximal convoluted tubule
- B. Loop of Henle
- C. Distal convoluted tubule
- D. Collecting duct

460 Fluid that enters the distal convoluted tubule is always ?

Harrison's 16th Ed 1641

- A. Isoosmotic
- B. Hypoosmotic
- C. Hyperosmotic
- D. None of the above

461 Calcium oxalate monohydrate crystals in the urinary sediment are typical of ?

N Engl J Med 2006;354:1065-72

- A. Antacid overdose
- B. Ethylene glycol ingestion
- C. Blunt abdominal trauma
- D. Fat embolism

462 Each kidney contains how many glomeruli in the renal cortex ?

N Engl J Med 2006;354:1387-401

- A. About 1 million
- B. About 2 million
- C. About 3 million
- D. About 4 million

463 Filtration barrier of capillary wall in glomerulus contains ?

N Engl J Med 2006;354:1387-401

- A. Fenestrated endothelium
- B. Glomerular basement membrane
- C. Interdigitating podocyte foot processes
- D. All of the above

464 Glomerular basement membrane has a thickness of ?

N Engl J Med 2006;354:1387-401

- A. 200 to 250 nm
- B. 300 to 350 nm
- C. 400 to 450 nm
- D. 500 to 550 nm

465 The terminal segment of the distal nephron is ?

Harrison's 16th. Ed. 1642

- A. Cortical collecting tubule
- B. Papillary collecting duct
- C. Terminal duct
- D. None of the above

466 Which of the following is a "salt-wasting nephropathy" ?

Harrison's 16th. Ed. 1642

- A. Chronic pyelonephritis
- B. Polycystic disease
- C. Medullary cystic disease
- D. All of the above

467 Main components of glomerular basement membrane are ?

N Engl J Med 2003;348:2543-56

- A. Type IV collagen
- B. Laminin
- C. Nidogen
- D. All of the above

468 Pierson's syndrome is a form of ?

N Engl J Med 2006;354:1387-401

- A. Congenital nephrotic syndrome
- B. Congenital heart disease
- C. Congenital bone disease
- D. Congenital eye disease

469 To convert the values for urea nitrogen to millimoles/liter, multiply by ?

- A. 0.157
- B. 0.257
- C. 0.357
- D. 0.457

470 To convert the values for creatinine to micromoles/liter, multiply by ?

- A. 68.4
- B. 78.4
- C. 88.4
- D. 98.4

471 To convert the values for glucose to millimoles per liter, multiply by ?

- A. 0.4551
- B. 0.5551
- C. 0.6551
- D. 0.7551

472 To convert the values for calcium to millimoles per liter, multiply by ?

- A. 0.150
- B. 0.250
- C. 0.350
- D. 0.450

473 To convert the values for phosphorus to millimoles per liter, multiply by ?

- A. 0.1229
- B. 0.2229
- C. 0.3229
- D. 0.4229

474 To convert the values for magnesium to millimoles per liter, multiply by ?

- A. 0.200
- B. 0.300
- C. 0.400
- D. 0.500

475 Chronic kidney disease (CKD) is divided into how many stages by National Kidney Foundation ?

Harrison's 17th Ed.

- A. 3
- B. 4
- C. 5
- D. 6

CKD is divided into six stages by National Kidney Foundation [Kidney Dialysis Outcomes Quality Initiative (KDOQI)] according to the estimated GFR.

476 Chronic renal failure typically corresponds to which of the following CKD stages ?

Harrison's 17th Ed.

- A. 1 - 3
- B. 2 - 4
- C. 3 - 5
- D. 4 - 5

Term CRF applies to the process of continuing significant irreversible reduction in nephron number and typically corresponds to CKD stages 3 - 5.

477 End-stage renal disease denotes which stage of CKD ?

Harrison's 17th Ed. 1762

- A. 2
- B. 3
- C. 4
- D. 5

End-stage renal disease denotes stage 5 of CKD.

478 Modification of Diet in Renal Disease (MDRD) formula for estimating GFR (mL/min per 1.73 m²) is ?

Harrison's 17th Ed. 1762 Table 274-2

- A. $1.56 \times (P_{Cr})^{-1.154} \times (age)^{-0.203}$
- B. $1.66 \times (P_{Cr})^{-1.154} \times (age)^{-0.203}$
- C. $1.76 \times (P_{Cr})^{-1.154} \times (age)^{-0.203}$
- D. $1.86 \times (P_{Cr})^{-1.154} \times (age)^{-0.203}$

479 Cockcroft-Gault equation for estimating creatinine clearance (ml/minute) is ?

Harrison's 17th Ed. 1762 Table 274-2

- A. $(120 - age \times body\ weight\ in\ kg) / (72 \times plasma\ creatinine)$
- B. $(130 - age \times body\ weight\ in\ kg) / (72 \times plasma\ creatinine)$
- C. $(140 - age \times body\ weight\ in\ kg) / (72 \times plasma\ creatinine)$
- D. $(150 - age \times body\ weight\ in\ kg) / (72 \times plasma\ creatinine)$

480 Middle molecules have a molecular mass between ?

Harrison's 17th Ed. 1762

- A. 500 & 1500 Da
- B. 1500 & 3000 Da
- C. 3000 & 5000 Da
- D. 5000 & 8000 Da

Compounds with a molecular mass between 500 & 1500 Da are middle molecules.

481 Normal annual mean decline in GFR with age is ?

Harrison's 17th Ed. 1762

- A. ~1 mL/min per year per 1.73 m²

- B. ~1.5 mL/min per year per 1.73 m²
- C. ~2 mL/min per year per 1.73 m²
- D. ~2.5 mL/min per year per 1.73 m²

482 Mean value of GFR at the age of 70 years is ?

Harrison's 17th Ed. 1762

- A. 70 mL/min per 1.73 m²
- B. 80 mL/min per 1.73 m²
- C. 90 mL/min per 1.73 m²
- D. 100 mL/min per 1.73 m²

Normal annual mean decline in GFR with age is ~1 mL/min per year per 1.73 m², reaching a mean value of 70 mL/min per 1.73 m² at the age of 70 years.

483 In adult males, persistence in urine of how much albumin per gram of creatinine signifies chronic renal damage ?

Harrison's 17th Ed. 1762

- A. > 11 mg
- B. > 13 mg
- C. > 15 mg
- D. > 17 mg

484 In adult females, persistence in urine of how much albumin per gram of creatinine signifies chronic renal damage ?

Harrison's 17th Ed. 1762

- A. > 18 mg
- B. > 21 mg
- C. > 23 mg
- D. > 25 mg

Persistence in urine of >17 mg of albumin per gram of creatinine in adult males and 25 mg albumin per gram of creatinine in adult females signifies CKD.

485 What is the GFR value (mL/min per 1.73 m²) in stage 5 of chronic kidney disease (CKD) ?

Harrison's 17th Ed. 1762 Table 274-1

- A. < 15
- B. 15 - 29
- C. 30 - 59
- D. 60 - 89

GFR in CKD (mL/min per 1.73 m²) - Stage 0 = >90, stage 1 = >=90, stage 2 = 60 - 89, stage 3 = 30 - 59, stage 4 = 15 - 29 and stage 5 = <15.

486 Out of the following, which is the most common cause of chronic kidney disease ?

Harrison's 17th Ed. 1762

- A. Diabetes mellitus
- B. Hypertension
- C. Glomerulonephritis
- D. Cystic kidney disease

Most frequent cause of CKD is diabetic nephropathy, secondary to type 2 diabetes mellitus. Hypertensive nephropathy is a common cause of CKD in the elderly.

487 Which of the following dysfunctions occur in uremic syndrome ?

Harrison's 17th Ed. 1763

- A. Renal excretory failure
- B. Progressive systemic inflammation
- C. Loss of hormone regulation
- D. All of the above

Uremic syndrome manifests as accumulation of toxins due to renal excretory failure, loss of fluid & electrolyte homeostasis & hormone regulation and progressive systemic inflammation with vascular & nutritional consequences.

488 Uremic "Toxins" include ?

Harrison's 16th Ed. 1654

- A. By-products of protein & amino acid metabolism
- B. End products of aliphatic amine metabolism
- C. End products of aromatic amino acid metabolism
- D. All of the above

489 Uremic "Toxins" include ?

Harrison's 17th Ed. 1765

- A. Urea
- B. Creatine
- C. Urates and hippurates
- D. All of the above

Apart from the above ones, PTH is also a uremic toxin.

490 Which of the following is a nitrogenous excretory product ?

Harrison's 16th Ed. 1654

- A. Polyamines
- B. Myoinositol
- C. Phenols
- D. All of the above

491 Which of the following is a nitrogenous excretory product ?

Harrison's 16th Ed. 1654

- A. Benzoates
- B. Indoles
- C. Phenols
- D. All of the above

492 Plasma levels of which of the following hormones rise with renal failure ?

Harrison's 16th Ed. 1654

- A. Parathyroid hormone (PTH)
- B. Prolactin
- C. Luteinizing hormone
- D. All of the above

493 Clinical abnormalities in uremia that develop only after initiation of dialysis therapy are all except ?

Harrison's 17th Ed. 1763 Table 274-3

- A. Adynamic osteomalacia
- B. Dialysis disequilibrium syndrome
- C. Hypotension & arrhythmias
- D. Hypothermia

494 Clinical abnormalities in uremia that develop only after initiation of dialysis therapy are all except ?

Harrison's 17th Ed. 1763 Table 274-3

- A. Hepatitis
- B. Idiopathic ascites
- C. Peritonitis
- D. Muscular irritability

- 495 Clinical abnormalities in uremia that develop only after initiation of dialysis therapy are all except ?**
Harrison's 17th Ed. 1763 Table 274-3
- Leukopenia
 - Hypocomplementemia
 - Muscle cramps
 - Hypernatremia & hyponatremia
- 496 Clinical abnormalities in uremia that improve with dialysis and erythropoietin therapy are all except ?**
Harrison's 17th Ed. 1763 Table 274-3
- Fatigue
 - Impaired mentation
 - Lethargy
 - Sleep disorders
- 497 Clinical abnormalities in uremia that improve with dialysis and erythropoietin therapy are all except ?**
Harrison's 17th Ed. 1763 Table 274-3
- Pallor
 - Anemia
 - Bleeding diathesis
 - Leukopenia
- 498 Gastrointestinal disturbances in uremia that usually improve with optimal dialysis & related therapy are all except ?**
Harrison's 17th Ed. 1763 Table 274-3
- Anorexia, nausea and vomiting
 - Uremic fetor
 - Gastroenteritis
 - Idiopathic ascites
- 499 Gastrointestinal disturbances in uremia that develop only after initiation of dialysis therapy are all except ?**
Harrison's 17th Ed. 1763 Table 274-3
- Hepatitis
 - Idiopathic ascites
 - Peritonitis
 - Uremic fetor
- 500 Endocrine-metabolic disturbances in uremia that develop only after initiation of dialysis therapy are all except ?**
Harrison's 17th Ed. 1763 Table 274-3
- Carbohydrate intolerance
 - Adynamic osteomalacia
 - Secondary hyperparathyroidism
 - Vitamin D-deficient osteomalacia
- 501 Endocrine-metabolic disturbances in uremia that usually improve with optimal dialysis & related therapy are all except ?**
Harrison's 17th Ed. 1763 Table 274-3
- Carbohydrate intolerance
 - Vitamin D-deficient osteomalacia
 - Hypothermia
 - All of the above
- 502 Endocrine-metabolic disturbances in uremia that tends to persist or even progress, despite optimal dialysis & related therapy are all except ?**
Harrison's 17th Ed. 1763 Table 274-3
- Increased Lp(a) level
 - Decreased high-density lipoprotein level
 - Infertility and sexual dysfunction
 - None of the above
- 503 Endocrine-metabolic disturbances in uremia that tends to persist or even progress, despite optimal dialysis & related therapy are all except ?**
Harrison's 17th Ed. 1763 Table 274-3
- Amenorrhea
 - Impaired growth & development
 - Infertility & sexual dysfunction
 - None of the above
- 504 Neuromuscular disturbances in uremia that usually improve with optimal dialysis & related therapy are all except ?**
Harrison's 17th Ed. 1763 Table 274-3
- Asterixis
 - Muscular irritability
 - Coma
 - Sleep disorder
- 505 Neuromuscular disturbances in uremia that develops only after initiation of dialysis therapy are all except ?**
Harrison's 17th Ed. 1763 Table 274-3
- Muscle cramps
 - Myoclonus
 - Dialysis disequilibrium syndrome
 - Myopathy
- 506 Neuromuscular disturbances in uremia that improve with dialysis and erythropoietin therapy are all except ?**
Harrison's 17th Ed. 1763 Table 274-3
- Fatigue
 - Impaired mentation
 - Lethargy
 - Asterixis
- 507 Cardiovascular & pulmonary disturbances in uremia that usually improve with optimal dialysis & related therapy are all except ?**
Harrison's 17th Ed. 1763 Table 274-3
- CHF / pulmonary edema
 - Pericarditis
 - Uremic lung
 - Hypotension & arrhythmias
- 508 Dermatologic disturbances in uremia that usually improve with optimal dialysis & related therapy are all except ?**
Harrison's 17th Ed. 1763 Table 274-3
- Ecchymoses
 - Uremic frost
 - Pallor
 - Pruritus

509 Which of the following leads to hyporeninemic hypoaldosteronism ?

Harrison's 17th Ed. 1764

- A. Diabetes mellitus
- B. Obstructive uropathy
- C. Sick cell nephropathy
- D. All of the above

In CKD, potassium levels may rise out of proportion to decline in GFR in conditions that lead to hyporeninemic hypoaldosteronism like diabetes, obstructive uropathy & sickle cell nephropathy.

510 Which of the following growth patterns is seen when cell mass of parathyroid glands increases with CKD ?

Harrison's 17th Ed. 1764

- A. Diffuse hyperplasia (polyclonal)
- B. Nodular growth (monoclonal) within diffuse hyperplasia
- C. Diffuse monoclonal hyperplasia ("adenoma" or tertiary autonomous hyperparathyroidism)
- D. Any of the above

Owing to increased PTH production from parathyroid cells, its cell mass increases progressively with CKD. Growth patterns may be diffuse hyperplasia (polyclonal), nodular growth (monoclonal) within diffuse hyperplasia or diffuse monoclonal hyperplasia ("adenoma" or tertiary autonomous hyperparathyroidism).

511 Brown tumor relates best with ?

Harrison's 17th Ed. 1765

- A. Subcutaneous tissue
- B. Bone
- C. Brain
- D. Liver

Bone histology in hyperparathyroidism may show bone cysts, at times with hemorrhagic elements giving it brown color, hence the term brown tumor.

512 Adynamic bone disease can result from ?

Harrison's 17th Ed. 1765

- A. Use of vitamin D preparations
- B. Excessive calcium-containing phosphate binders
- C. High-calcium dialysis solutions
- D. All of the above

Adynamic bone disease is a state of reduced bone volume & mineralization. It results from excessive PTH suppression from the use of vitamin D preparations or from excessive calcium exposure in the form of calcium-containing phosphate binders or high-calcium dialysis solutions.

513 Calciphylaxis is best related to which drug ?

Harrison's 17th Ed. 1765

- A. Aspirin
- B. Statins
- C. Warfarin
- D. All of the above

Calciphylaxis (livedo reticularis & ischemic necrosis) is seen almost exclusively in advanced CKD due to vascular occlusion secondary to extensive vascular calcification. Warfarin therapy decreases vitamin K-dependent regeneration of matrix GLA protein which prevents vascular calcification.

514 Which of the following is a phosphate binder ?

Harrison's 17th Ed. 1766

- A. Calcium acetate
- B. Calcium carbonate
- C. Sevelamer

- D. All of the above

Phosphate binders are calcium acetate, calcium carbonate and Sevelamer.

515 Which of the following is a consequence of a very low PTH level ?

Harrison's 17th Ed. 1766

- A. Adynamic bone disease
- B. Fracture
- C. Ectopic calcification
- D. All of the above

In CKD, target PTH level should be between 150 and 300 pg/mL. Very low PTH levels cause adynamic bone disease, fracture and ectopic calcification.

516 Which of the following is not a negative acute-phase reactant ?

Harrison's 17th Ed. 1766

- A. Transthyretin
- B. Fetuin (AHSG)
- C. Albumin
- D. Fibrinogen

Fetuin (AHSG), a glycoprotein is synthesized by hepatocytes & is present in the circulation. It has the highest capacity of inhibiting soft tissue calcification.

517 Which of the following is associated with poor prognosis in late-stage CKD patients ?

Harrison's 17th Ed. 1767

- A. Low blood pressure
- B. Reduced body mass index
- C. Hypolipidemia
- D. All of the above

In late-stage CKD, low BP, reduced BMI & hypolipidemia indicate the presence of a malnutrition-inflammation state, with poor prognosis.

518 In CKD patients with diabetes or proteinuria > 1 gram/day, blood pressure should be reduced to ?

Harrison's 17th Ed. 1767

- A. 110 / 70 mm Hg
- B. 125 / 75 mm Hg
- C. 135 / 85 mm Hg
- D. 140 / 90 mm Hg

In CKD patients with diabetes or proteinuria > 1 gram/day, BP should be reduced to 125/75 mm Hg. Renoprotective effect of antihypertensive medications is gauged by consequent reduction of proteinuria.

519 Pericardial effusion is a side effect of ?

Harrison's 17th Ed. 1767

- A. Prazosin
- B. Minoxidil
- C. Eplerenone
- D. Labetalol

Side effects of minoxidil include hypertrichosis and pericardial effusion.

520 Normocytic, normochromic anemia is almost always present by which stage of CKD ?

Harrison's 17th Ed. 1767

- A. Stage 1
- B. Stage 2
- C. Stage 3

D. Stage 4

Normocytic, normochromic anemia is almost always present by stage 4 of CKD.

521 Primary cause of anemia in patients with CKD is ?

Harrison's 17th Ed. 1767

- A. Insufficient erythropoietin (EPO)
- B. Iron deficiency
- C. Anemia of chronic disease
- D. Bone marrow fibrosis

Primary cause of anemia in patients with CKD is insufficient production of erythropoietin (EPO) by the diseased kidneys.

522 Abnormal bleeding time and coagulopathy in renal failure may be reversed temporarily with ?

Harrison's 17th Ed. 1768

- A. Desmopressin (DDAVP)
- B. IV conjugated estrogens
- C. Erythropoietin (EPO) therapy
- D. All of the above

Abnormal BT & coagulopathy in renal failure may be reversed temporarily with DDAVP, cryoprecipitate, IV conjugated estrogens, blood transfusions & EPO.

523 Peripheral neuropathy of CKD becomes clinically evident after which stage of CKD ?

Harrison's 17th Ed. 1768

- A. Stage 1
- B. Stage 2
- C. Stage 3
- D. Stage 4

Peripheral neuropathy usually becomes clinically evident after stage 4 of CKD.

524 Which of the following is true for peripheral neuropathy of CKD ?

Harrison's 17th Ed. 1768

- A. Sensory nerves involved more than motor
- B. Lower extremities involved more than upper
- C. Distal parts of extremities involved more than proximal
- D. All of the above

525 Uremic fetor is due to breakdown of urea to ammonia in ?

Harrison's 17th Ed. 1768

- A. Saliva
- B. Lung
- C. Mucous membranes of mouth
- D. All of the above

Uremic fetor (urine-like odor on breath) is due to breakdown of urea to ammonia in saliva.

526 Skin pigmentation in advanced CKD is due to ?

Harrison's 17th Ed. 1769

- A. Chromogens
- B. Chromolytes
- C. Urochromes
- D. Renochromes

Patients become more pigmented in advanced CKD, even on dialysis due to deposition of retained pigmented metabolites called urochromes.

527 Nephrogenic fibrosing dermopathy is similar to ?

Harrison's 17th Ed. 1769

- A. Guttate morphea
- B. Scleromyxedema
- C. Linear scleroderma
- D. Diffuse fasciitis with eosinophilia

Nephrogenic fibrosing dermopathy, seen in CKD, is a progressive subcutaneous induration on arms & legs similar to scleromyxedema.

528 Which of the following can precipitate nephrogenic fibrosing dermopathy ?

Harrison's 17th Ed. 1769

- A. Vitamin D
- B. Metformin
- C. Aluminum
- D. Gadolinium

Exposure to magnetic resonance contrast agent, gadolinium may precipitate nephrogenic fibrosing dermopathy or nephrogenic systemic fibrosis (NSF) between 5 & 75 days following exposure.

529 CKD is likely if bilateral kidney size is ?

Harrison's 17th Ed. 1770

- A. < 8.5 cm
- B. < 9.0 cm
- C. < 9.5 cm
- D. < 10 cm

Finding of bilaterally reduced kidney size (<8.5 cm) favors CKD.

530 Clear indications for initiation of renal replacement therapy include ?

Harrison's 17th Ed. 1771

- A. Pericarditis
- B. Progressive neuropathy due to uremia
- C. Encephalopathy
- D. All of the above

531 Clear indications for initiation of renal replacement therapy include ?

Harrison's 17th Ed. 1771

- A. Muscle irritability
- B. Anorexia & nausea not relieved by protein restriction
- C. Refractory fluid & electrolyte abnormalities
- D. All of the above

532 Clear indications for initiation of renal replacement therapy include ?

Harrison's 17th Ed. 1771

- A. Unresponsive volume overload
- B. Unresponsive hyperkalemia
- C. Progressive metabolic acidosis
- D. All of the above

Clear indications for initiation of renal replacement therapy in CKD include pericarditis, encephalopathy, intractable muscle cramping, anorexia, nausea, malnutrition, & refractory fluid & electrolyte abnormalities (hyperkalemia).

533 Clinical clues indicating the imminent development of uremic complications are ?

Harrison's 16th Ed. 1662

- A. History of hiccoughing
- B. Intractable pruritus

- C. Morning nausea & vomiting
D. All of the above
- 534 Clinical clues indicating the imminent development of uremic complications are ?**
Harrison's 16th Ed. 1662
A. Muscle twitching & cramps
B. Asterixis
C. Non-compliance of treatment
D. All of the above
- 535 Calcium reabsorption in cortical thick ascending limb of Henle's loop (cTAL) requires which of the following ?**
Harrison's 16th Ed. 2241
A. PTH
B. $1,25(\text{OH})_2\text{D}$
C. Paracellin-1
D. Calbindin-D28k
- 536 In cells & in ECF, phosphorus exists in which form ?**
Harrison's 16th Ed. 2241
A. H_2PO_4^-
B. NaHPO_4^-
C. HPO_4^{2-}
D. All of the above
- 537 In adults, above what level of fasting serum phosphate concentration is called Hyperphosphatemia ?**
Harrison's 16th Ed. 2243
A. 2.5 mg/dL
B. 3.5 mg/dL
C. 4.5 mg/dL
D. 5.5 mg/dL
- 538 Normally, the concentration of magnesium in serum is ?**
Harrison's 16th Ed. 2244
A. 0.7 to 1.2 mg/dL
B. 1.2 to 1.6 mg/dL
C. 1.7 to 2.4 mg/dL
D. 2.4 to 2.9 mg/dL
- 539 Which of the following should be supplemented in patients with hypomagnesemia ?**
Harrison's 16th Ed. 2245
A. Calcium
B. Potassium
C. Phosphate
D. All of the above
- 540 Which of the following prolong QT interval ?**
Harrison's 16th Ed. 1319
A. Quinidine
B. Subarachnoid hemorrhage
C. Hypocalcemia
D. All of the above

- 541 "Sine-wave" pattern in ECG is seen in ?**

Harrison's 16th Ed. 1319

- A. Hypokalemia
B. Hyperkalemia
C. Hypercalcemia
D. Hypothermia

Chapter 281. Dialysis in the Treatment of Renal Failure

- 542 What is the size of urea molecule ?**

Harrison's 18th Ed. 2322

- A. 50 Da
B. 60 Da
C. 70 Da
D. 80 Da

- 543 What is the size of creatinine molecule ?**

Harrison's 18th Ed. 2322

- A. 100 Da
B. 113 Da
C. 123 Da
D. 132 Da

Size of urea molecule is 60 Da, while that of creatinine is 113 Da.

- 544 Which of the following is a category of dialysis membrane ?**

Harrison's 18th Ed. 2322

- A. Cellulose
B. Cellulosynthetic
C. Synthetic
D. All of the above

Categories of dialysis membranes are cellulose, substituted cellulose, cellulosynthetic and synthetic.

- 545 Surface area of modern dialysis membranes in adult patients is ?**

Harrison's 18th Ed. 2322

- A. 0.5 - 1.0 m^2
B. 1.5 - 2.0 m^2
C. 2.5 - 3.0 m^2
D. 3.5 - 4.0 m^2

Surface area of modern dialysis membranes in adult patients is ~1.5 - 2.0 m^2 .

- 546 Which of the following improve the 'Biocompatibility' of a dialysis membrane ?**

Harrison's 18th Ed. 2322

- A. More free hydroxyl groups on membrane surface
B. Less free hydroxyl groups on membrane surface
C. More free sulphydral groups on membrane surface
D. Less free sulphydral groups on membrane surface

Biocompatibility is defined as the ability of dialysis membrane to activate complement cascade. Cellulosic membranes are bioincompatible because of the presence of free hydroxyl groups on membrane surface.

547 Which of the following is a form of synthetic membrane ?

Harrison's 18th Ed. 2322

- A. Polysulfone
- B. Polymethylmethacrylate
- C. Polyacrylonitrile
- D. All of the above

Examples of synthetic membranes are polysulfone, polymethylmethacrylate, and polyacrylonitrile membranes. These are more biocompatible because of the absence of free hydroxyl groups.

548 Reprocessing agent used in a hemodialyzer include ?

Harrison's 18th Ed. 2323

- A. Formaldehyde
- B. Peracetic acid – hydrogen peroxide
- C. Glutaraldehyde
- D. All of the above

Formaldehyde, peracetic acid–hydrogen peroxide, glutaraldehyde and bleach are used as reprocessing agents.

549 During each hemodialysis, patient is exposed to approximately how much water as dialysate ?

Harrison's 18th Ed. 2323

- A. 80 L
- B. 120 L
- C. 180 L
- D. 250 L

Patients are exposed to ~120 liters of water during each dialysis treatment.

550 Blood flow rate in the extracorporeal circuit in hemodialysis machine ranges from ?

Harrison's 18th Ed. 2323

- A. 50 to 100 mL/min
- B. 100 to 200 mL/min
- C. 250 to 500 mL/min
- D. 500 to 750 mL/min

Blood flow rate in extracorporeal circuit in hemodialysis machine ranges from 250 - 500 mL/minute.

551 'Brescia - Cimino fistula' is used for ?

Harrison's 18th Ed. 2323

- A. Dialysis access
- B. Ventriculo-atrial shunt
- C. Peritono-caval shunt
- D. Peripheral arterial bypass

In Brescia-Cimino fistula, cephalic vein is anastomosed end-to-side to radial artery for dialysis access.

552 Most common dialysis access-related complication is ?

Harrison's 18th Ed. 2324

- A. Infection
- B. Thrombosis
- C. Embolism
- D. Perforation

Most important complication of AV grafts is thrombosis of the graft & graft failure, due to intimal hyperplasia at anastomosis between graft & recipient vein.

553 In hemodialysis, dialysate flows in an opposite counter-current direction at the rate of ?

Harrison's 18th Ed. 2324

- A. 100 to 300 mL/min
- B. 300 to 500 mL/min
- C. 500 to 800 mL/min
- D. 800 to 1000 mL/min

Dialysate flows in an opposite counter-current direction at 500 - 800 mL/minute.

554 What level of urea reduction ratio (URR) per treatment, defines minimal standards for adequacy among ESRD patients ?

Harrison's 18th Ed. 2324

- A. 35 %
- B. 45 %
- C. 55 %
- D. 65 %

Current target is a urea reduction ratio (fractional reduction in BUN per hemodialysis session) of >65 - 70%

555 What level of KT/V per treatment, defines minimal standards for adequacy among ESRD patients ?

Harrison's 18th Ed. 2324

- A. 0.8
- B. 1.0
- C. 1.2
- D. 1.4

Current target is body water-indexed clearance x time product (KT/V) above 1.2.

556 For the majority of patients with ESRD, how many hours of dialysis is required each week ?

Harrison's 18th Ed. 2324

- A. 3 to 9 hours
- B. 9 to 12 hours
- C. 12 to 24 hours
- D. 24 to 36 hours

For the majority of patients with ESRD, between 9 and 12 h of dialysis are required each week, usually divided into three equal sessions.

557 Most common acute complication of hemodialysis is ?

Harrison's 18th Ed. 2324

- A. Infection
- B. Hypotension
- C. Anemia
- D. Anaphylactoid reactions

Hypotension is the most common acute complication of hemodialysis, particularly among diabetics.

558 In dialysate, presence of which of the following is a common cause of hypotension ?

Harrison's 18th Ed. 2324

- A. Acetate
- B. Bicarbonate
- C. Calcium
- D. Aluminium

Because of the vasodilatory & cardiodepressive effects of acetate, its use as buffer in dialysate is a common cause of hypotension.

559 In the management of hypotension during dialysis, administration of which of the following is useful ?

Harrison's 18th Ed. 2324

- A. 100 to 250 mL of isotonic saline
- B. 10 mL of 23 % saturated hypertonic saline
- C. Salt-poor albumin
- D. All of the above

Hypotension during dialysis is managed with discontinuing ultrafiltration, 100 - 250 mL of isotonic saline or 10 mL of 23% saturated hypertonic saline, and administration of salt-poor albumin.

560 Hypotension during dialysis can be prevented by ?

Harrison's 18th Ed. 2324

- A. Careful evaluation of dry weight
- B. Withholding of antihypertensive medications
- C. Avoiding heavy meals during dialysis
- D. All of the above

561 Hypotension during dialysis can be prevented by ?

Harrison's 18th Ed. 2324

- A. Ultrafiltration modeling
- B. Midodrine
- C. Cooling of dialysate during dialysis treatment
- D. All of the above

562 Which of the following may prevent muscle cramps during hemodialysis ?

Harrison's 18th Ed. 2324

- A. Reducing volume removal during dialysis
- B. Use of higher concentrations of sodium in dialysate
- C. Quinine sulfate before treatment
- D. All of the above

563 In peritoneal dialysis, how much dextrose-containing solution is infused in the peritoneal cavity ?

Harrison's 18th Ed. 2325

- A. 1 to 3 L
- B. 4 to 6 L
- C. 6 to 8 L
- D. 10 to 12 L

564 In peritoneal dialysis, for how many hours dextrose-containing solution is allowed to remain in the peritoneal cavity ?

Harrison's 18th Ed. 2325

- A. 1 to 2 hours
- B. 2 to 4 hours
- C. 4 to 6 hours
- D. 6 to 8 hours

In peritoneal dialysis, 1.5 - 3 liters of a dextrose-containing solution is infused into peritoneal cavity & allowed for 2 - 4 hours.

565 Advantage of Continuous renal replacement therapy (CRRT) over intermittent hemodialysis in ARF is ?

Harrison's 18th Ed. 2325

- A. Better tolerated hemodynamically
- B. Gradual correction of biochemical abnormalities
- C. Highly effective in removing fluid
- D. All of the above

566 Continuous renal replacement therapy (CRRT) techniques include ?

Harrison's 16th Ed. 1666

- A. Continuous arteriovenous hemodiafiltration with dialysis
- B. Continuous arteriovenous hemodiafiltration without dialysis
- C. Continuous veno-venous hemodiafiltration with dialysis
- D. All of the above

567 Which of the following is a type of 'Peritoneal dialysis' ?

Harrison's 16th Ed. 1667

- A. Continuous ambulatory peritoneal dialysis (CAPD)
- B. Continuous cyclic peritoneal dialysis (CCPD)
- C. Nocturnal intermittent peritoneal dialysis (NIPD)
- D. All of the above

568 Which of the following is false for CAPD ?

Harrison's 16th Ed. 1667

- A. Dialysis solution is manually infused into peritoneal cavity
- B. Dialysis solution remains in peritoneal cavity through night
- C. Drainage of spent dialysate is performed manually
- D. None of the above

569 Which of the following statements is false ?

Harrison's 16th Ed. 1667

- A. In CCPD, exchanges are performed in automated fashion
- B. In CCPD, the last exchange remains in abdomen
- C. In NIPD, the abdomen is left dry during the day
- D. None of the above

570 Preferred buffer in peritoneal dialysis solution is ?

Harrison's 18th Ed. 2325

- A. Lactate
- B. Bicarbonate
- C. Acetate
- D. All of the above

Lactate is the preferred buffer in peritoneal dialysis solutions.

571 Additive to peritoneal dialysis solutions may be ?

Harrison's 18th Ed. 2325

- A. Heparin
- B. Antibiotics
- C. Insulin
- D. All of the above

Additives to peritoneal dialysis solutions are heparin, antibiotics and insulin.

572 Which of the following is a complication of peritoneal dialysis ?

Harrison's 18th Ed. 2326

- A. Peritonitis
- B. Weight gain
- C. Residual uremia
- D. All of the above

Complications of PD are peritonitis, catheter-associated nonperitonitis infections, weight gain, metabolic disturbances and residual uremia.

573 What value of peritoneal fluid leukocyte count denotes peritonitis ?

Harrison's 18th Ed. 2326

- A. 10 / mm³
- B. 40 / mm³
- C. 80 / mm³
- D. 100 / mm³

Peritonitis is defined by a raised peritoneal fluid leukocyte count (100/mm³, 50% are PMN).

574 Most common culprit organism in peritonitis as a complication of peritoneal dialysis is ?

Harrison's 18th Ed. 2326

- A. Gram-positive cocci
- B. Gram-positive bacilli
- C. Gram-negative cocci
- D. Gram-negative bacilli

Most common culprit organisms in peritonitis as a complication of peritoneal dialysis are gram-positive cocci.

575 Nonperitonitis catheter-associated infections are termed as ?

Harrison's 18th Ed. 2326

- A. Funnel infections
- B. Tunnel infections
- C. Channel infections
- D. Chamber infections

Nonperitonitis catheter-associated infections are often termed tunnel infections.

576 Which of the following statements is false ?

Harrison's 16th Ed. 1667

- A. Acetate in PD solution can accelerate peritoneal sclerosis
- B. Bicarbonate in PD solution can precipitate calcium
- C. Bicarbonate in PD solution can caramelize glucose
- D. None of the above

Chapter 283. Glomerular Diseases

577 Number of glomerular capillary tufts in the two human kidneys is about ?

Harrison's 18th Ed. 2334

- A. 0.6 million
- B. 1.2 million
- C. 1.8 million
- D. 2.4 million

About 1.8 million glomerular capillary tufts are found in the two human kidneys.

578 Pores in the glomerular basement membrane (GBM) and slit-pore membranes have a radius of ?

Harrison's 18th Ed. 2334

- A. 2 nm
- B. 4 nm
- C. 6 nm
- D. 8 nm

Pores in the GBM and slit-pore membranes have a radius of 4 nm.

579 Which of the following is instrumental in reclaiming filtered albumin along the proximal tubule ?

Harrison's 18th Ed. 2334

- A. Crucin
- B. Optimin
- C. Megalin
- D. Reglin

4000 to 9000 mg/day of albumin is filtered and is reclaimed by megalin and cubilin receptors along the proximal tubule.

580 Congenital nephrotic syndrome occurs due to mutations in ?

Harrison's 18th Ed. 2335

- A. PROP-1
- B. NPHS1
- C. PAX-8
- D. PIT-1

Congenital nephrotic syndrome occurs due to mutations in NPHS1 (nephlin) and NPHS2 (podocin).

581 Glomerulonephritis refers to inflammation of ?

Harrison's 18th Ed. 2335

- A. Glomerular capillaries
- B. Glomerular arterioles
- C. Glomerular basement membrane (GBM)
- D. All of the above

Inflammation of the glomerular capillaries is called glomerulonephritis.

582 In glomerulonephritis, cytokines & proteases damage which of the following ?

Harrison's 18th Ed. 2335

- A. Mesangium
- B. Capillaries
- C. GBM
- D. All of the above

Chemokines attract neutrophils, macrophages & T cells into glomerular tuft. These react with antigens & epitopes producing more cytokines & proteases that damage mesangium, capillaries, and/or GBM.

583 Which of the following is associated with immune deposits along the GBM ?

Harrison's 18th Ed. 2335

- A. Poststreptococcal glomerulonephritis
- B. Lupus nephritis
- C. Idiopathic membranous nephritis
- D. All of the above

Poststreptococcal glomerulonephritis, lupus nephritis, and idiopathic membranous nephritis typically are associated with immune deposits along the GBM.

584 Persistent glomerulonephritis that worsens renal function is always accompanied by ?

Harrison's 18th Ed. 2335

- A. Interstitial nephritis
- B. Renal fibrosis
- C. Tubular atrophy
- D. All of the above

Persistent glomerulonephritis that worsens renal function is always accompanied by interstitial nephritis, renal fibrosis, and tubular atrophy.

585 Renal failure in glomerulonephritis best correlates histologically with the appearance of ?

Harrison's 18th Ed. 2335

- A. Tubulointerstitial nephritis
- B. Papillary necrosis
- C. Cystic kidney disease
- D. All of the above

Renal failure in glomerulonephritis best correlates histologically with the appearance of tubulointerstitial nephritis.

586 Cause of microscopic hematuria is ?

Harrison's 18th Ed. 2337

- A. Interstitial nephritis
- B. Papillary necrosis
- C. Cystic kidney diseases
- D. All of the above

Microscopic hematuria may appear with the onset of benign prostatic hypertrophy, interstitial nephritis, papillary necrosis, renal stones, cystic kidney diseases, or renal vascular injury.

587 Normal 24-hour urine protein is ?

Harrison's 18th Ed. 2337 Table 283-1

- A. < 30 mg/day
- B. < 100 mg/day
- C. < 150 mg/day
- D. < 300 mg/day

Normal 24-hour urine protein is < 150 mg/day.

588 Albumin comprises what percentage of total proteins excreted in the urine ?

Harrison's 18th Ed. 2337 Table 283-1

- A. 10 - 30 %
- B. 20 - 50 %
- C. 30 - 70 %
- D. 40 - 90 %

Albumin represents 30 - 70 % of the total protein excreted in the urine.

589 Sustained isolated proteinuria is found in ?

Harrison's 18th Ed. 2337

- A. Diabetic nephropathy
- B. Mesangioproliferative glomerulonephritis
- C. FSGS
- D. All of the above

Sustained isolated proteinuria is found in diabetic nephropathy, nil lesion, mesangioproliferative glomerulonephritis, and FSGS.

590 Orthostatic proteinuria is evident only in ?

Harrison's 18th Ed. 2337

- A. Upright position
- B. Recumbent position
- C. Sitting position
- D. Lateral position

Proteinuria only seen with upright posture is called orthostatic proteinuria.

591 Functional proteinuria refers to ?

Harrison's 18th Ed. 2337

- A. Proteinuria in females
- B. Proteinuria during fever, emotional stress
- C. Proteinuria in UTI
- D. Proteinuria in upright posture

Benign, functional or transient proteinuria occurs in normal population, nonsustained, and <1 gram/day. Fever, exercise, obesity, sleep apnea, emotional stress & congestive heart failure cause transient proteinuria.

592 Which of the following can present with gross hematuria ?

Harrison's 18th Ed. 2339 Table 283-2

- A. Focal segmental glomerulosclerosis
- B. Mesangioproliferative glomerulonephritis
- C. IgA nephropathy
- D. Subacute bacterial endocarditis

593 Which of the following can present with gross hematuria ?

Harrison's 18th Ed. 2339 Table 283-2

- A. Henoch-Schönlein purpura
- B. Antiphospholipid syndrome
- C. Sickle cell disease
- D. Nail-patella syndrome

In IgA nephropathy & sickle cell disease, gross hematuria is present.

594 Asymptomatic hematuria is due to ?

Harrison's 16th Ed. 1690

- A. IgA nephropathy (Berger's disease)
- B. Thin basement membrane (TBM) disease
- C. Alport's syndrome
- D. All of the above

595 Which of the following is false about a 'crescent' ?

Harrison's 18th Ed. 2339

- A. Half-moon-shaped collection of cells in Bowman's space
- B. Composed of proliferating parietal epithelial cells and infiltrating macrophages
- C. Crescentic glomerulonephritis is also called rapidly progressive glomerulonephritis
- D. None of the above

596 Which of the following does not present as rapidly progressive glomerulonephritis (RPGN) ?

Harrison's 18th Ed. 2339 Table 283-2

- A. Poststreptococcal glomerulonephritis
- B. Subacute bacterial endocarditis
- C. Wegener's granulomatosis
- D. Henoch-Schönlein purpura

597 Which of the following does not present as rapidly progressive glomerulonephritis (RPGN) ?

Harrison's 18th Ed. 2339 Table 283-2

- A. Poststreptococcal glomerulonephritis
- B. Mesangioproliferative glomerulonephritis
- C. Membranoproliferative glomerulonephritis
- D. Lupus nephritis

598 Henoch-Schönlein purpura has which of the following patterns of clinical glomerulonephritis ?

Harrison's 18th Ed. 2339 Table 283-2

- A. Acute Nephritic Syndrome
- B. Pulmonary-Renal Syndrome
- C. Glomerular Vascular Syndrome
- D. All of the above

599 Wegener's granulomatosis has which of the following patterns of clinical glomerulonephritis ?

Harrison's 18th Ed. 2339 Table 283-2

- A. Acute Nephritic Syndrome
- B. Pulmonary-Renal Syndrome
- C. Glomerular Vascular Syndrome
- D. All of the above

600 Cryoglobulinemia has which of the following patterns of clinical glomerulonephritis ?

Harrison's 18th Ed. 2339 Table 283-2

- A. Acute Nephritic Syndrome
- B. Pulmonary-Renal Syndrome
- C. Glomerular Vascular Syndrome
- D. All of the above

601 Churg-Strauss syndrome has which of the following patterns of clinical glomerulonephritis ?

Harrison's 18th Ed. 2339 Table 283-2

- A. Acute Nephritic Syndrome
- B. Pulmonary-Renal Syndrome
- C. Glomerular Vascular Syndrome
- D. All of the above

602 Which of the following stains is used to enhance basement membrane structure in renal biopsy ?

Harrison's 18th Ed. 2339

- A. Hematoxylin and eosin
- B. Periodic acid-Schiff (PAS)
- C. Jones-methenamine silver
- D. Masson's trichrome

Renal biopsy specimen are stained with H&E for cellularity & architecture, PAS for carbohydrate moieties in glomerular tuft & tubule membranes, Jones-methenamine silver to enhance basement membrane structure, Congo red for amyloid deposits, & Masson's trichrome to identify collagen deposition to assess degree of glomerulosclerosis & interstitial fibrosis.

603 By light microscopy, ideally how many glomeruli should be reviewed individually for discrete lesions ?

Harrison's 18th Ed. 2339

- A. 1
- B. 5
- C. 10
- D. 20

By light microscopy, ideally 20 glomeruli should be reviewed individually for discrete lesions.

604 'Focal glomerulonephritis' is said to occur when lesion involves what proportion of glomeruli ?

Harrison's 18th Ed. 2339

- A. < 50 %

- B. < 60 %
- C. < 70 %
- D. < 80 %

If <50% glomeruli are involved, lesion is considered focal, else diffuse.

605 In renal biopsy, which of the following is an ominous sign of irreversibility and progression to renal failure ?

Harrison's 18th Ed. 2340

- A. Synechiae
- B. Interstitial fibrosis
- C. Crescents
- D. All of the above

Interstitial fibrosis is an ominous sign of irreversibility & progression to renal failure.

606 Acute nephritic syndromes classically present with ?

Harrison's 18th Ed. 2340

- A. Hypertension
- B. Hematuria
- C. Pyuria
- D. All of the above

Acute nephritic syndromes classically present with hypertension, hematuria, red blood cell casts, pyuria, and mild to moderate proteinuria.

607 Circulating immune-complex formation and deposition within the glomerulus is seen in ?

Harrison's 18th Ed. 2340-41

- A. Subacute bacterial endocarditis (SABE)
- B. Lupus nephritis
- C. Hepatitis-C-related cryoglobulinaemia
- D. All of the above

Circulating immune-complex formation and deposition within the glomerulus is seen with SABE, lupus nephritis, & hepatitis-C-related cryoglobulinaemia.

608 Poststreptococcal glomerulonephritis is prototypical for ?

Harrison's 18th Ed. 2340

- A. Acute endocapillary proliferative glomerulonephritis
- B. Mesangiocapillary glomerulonephritis
- C. Lobar glomerulonephritis
- D. Segmental necrotizing glomerulonephritis

Poststreptococcal glomerulonephritis is prototypical for acute endocapillary proliferative glomerulonephritis.

609 Poststreptococcal glomerulonephritis develops how many weeks after streptococcal pharyngitis ?

Harrison's 18th Ed. 2340

- A. 1 - 3 weeks
- B. 2 - 6 weeks
- C. 3 - 6 weeks
- D. 4 - 8 weeks

610 Poststreptococcal glomerulonephritis due to impetigo develops how many weeks after the skin infection ?

Harrison's 18th Ed. 2340

- A. 1 - 3 weeks
- B. 2 - 6 weeks

- C. 3 - 6 weeks
D. 4 - 8 weeks

Poststreptococcal glomerulonephritis due to impetigo develops 2 - 6 weeks after skin infection and 1 - 3 weeks after streptococcal pharyngitis.

611 In the first week of poststreptococcal glomerulonephritis, which of the following findings is false ?

Harrison's 18th Ed. 2340

- A. Depressed total hemolytic complement (CH_{50})
B. Decreased levels of C_3
C. Normal levels of C_4
D. None of the above

90% patients of poststreptococcal glomerulonephritis will have depressed CH_{50} & decreased levels of C_3 with normal levels of C_4 in first week of symptoms.

612 Poststreptococcal glomerulonephritis develops how many days after pharyngitis ?

Harrison's 16th Ed. 1680

- A. 10 days
B. 20 days
C. 30 days
D. 40 days

613 Poststreptococcal glomerulonephritis develops how many weeks after skin infection ?

Harrison's 16th Ed. 1680

- A. 1 week
B. 2 weeks
C. 3 weeks
D. 4 weeks

614 "Starry sky" appearance on immunofluorescence microscopy of renal biopsy is seen in ?

Harrison's 16th Ed. 1681

- A. Acute poststreptococcal glomerulonephritis
B. Lupus nephritis
C. Glomerulonephritis in SLE
D. Goodpasture's syndrome

615 Lupus nephritis is most severe in ?

Harrison's 18th Ed. 2340

- A. African-American female adolescents
B. White elderly
C. Australian aboriginals
D. Chinese young male

Lupus nephritis is most severe in African-American female adolescents as a complication of SLE.

616 Which of the following glomerulonephritis is more common in female than in male population ?

Harrison's 18th Ed. 2341

- A. Alport's Syndrome
B. Goodpasture's syndrome
C. Lupus nephritis
D. Nail-patella syndrome

Lupus nephritis is two + times more in female than among male population.

617 First name of Goodpasture was ?

N Engl J Med 2003;348:2543-56

- A. Albert
B. Ellis
C. Ernest
D. Eric

Ernest Goodpasture published his observation as "The pathology of pneumonia accompanying influenza. U S Naval Med Bull 1919;13:177-97".

618 Which of the following is not a basement membrane syndrome ?

Harrison's 18th Ed. 2350

- A. Alport's Syndrome
B. Goodpasture's syndrome
C. Churg-Strauss syndrome
D. Nail-patella syndrome

619 Which of the following is true for 'anti-GBM disease' ?

Harrison's 18th Ed. 2351

- A. Detectable circulating anti-GBM autoantibodies
B. Normal serum complement levels
C. Absent ANCA
D. All of the above

620 Which of the following is true for Goodpasture's syndrome ?

Harrison's 18th Ed. 2342

- A. Anti-GBM nephritis
B. Lung hemorrhage
C. Autoimmune disease
D. All of the above

621 Which of the following is a protomer of collagen IV ?

N Engl J Med 2003;348:2543-56

- A. $\alpha 1. \alpha 1. \alpha 2(IV)$
B. $\alpha 3. \alpha 4. \alpha 5(IV)$
C. $\alpha 5. \alpha 5. \alpha 6(IV)$
D. All of the above

The six chains of collagen IV form only three sets of triple helical molecules called protomers designated as $\alpha 1. \alpha 1. \alpha 2(IV)$, $\alpha 3. \alpha 4. \alpha 5(IV)$, and $\alpha 5. \alpha 5. \alpha 6(IV)$.

622 Which chain of type IV collagen is the target antigen in Goodpasture's syndrome ?

Harrison's 18th Ed. 2342

- A. $\alpha 1$
B. $\alpha 2$
C. $\alpha 3$
D. $\alpha 4$

623 Which chain of type IV collagen is called 'Goodpasture antigen' ?

Harrison's 18th Ed. 2342

- A. $\alpha 3$
B. $\alpha 4$
C. $\alpha 5$
D. $\alpha 6$

624 Which of the following is known as "Goodpasture protomer" ?

N Engl J Med 2003;348:2543-56

- A. $\alpha 3(\text{IV}) \text{NC1}$
- B. $\alpha 5.\alpha 5.\alpha 6(\text{IV})$
- C. $\alpha 3.\alpha 4.\alpha 5(\text{IV})$
- D. $\alpha 1.\alpha 1.\alpha 2(\text{IV})$

$\alpha 3.\alpha 4.\alpha 5(\text{IV})$ protomer is a basement-membrane molecule of family of type IV collagens in epithelial tissues and is called the "Goodpasture protomer".

625 $\alpha 3$ (IV) NC1 peptides are produced by ?

N Engl J Med 2003;348:2543-56

- A. Lymph node
- B. Bone marrow
- C. Spleen
- D. Thymus

Thymus expresses $\alpha 3$ (IV) NC1 peptides that can cause elimination of autoreactive CD4+ helper T cells. A few such T cells escape deletion and can engage in the production of anti-glomerular basement membrane antibodies.

626 Which of the following is false about Goodpasture's syndrome ?

Harrison's 18th Ed. 2342

- A. Occurs in young men in late 20s
- B. Occurs in men & women in 60 - 70s
- C. Hemoptysis is largely confined to smokers
- D. None of the above

627 Antibodies against the $\alpha 1(\text{IV})$ NC1 domain is seen in patients with ?

Harrison's 18th Ed. 2342

- A. Leukemia
- B. Paraneoplastic syndrome
- C. SLE
- D. All of the above

Antibodies against the $\alpha 1(\text{IV})$ NC1 domain is seen in patients with paraneoplastic syndrome.

628 In Goodpasture's syndrome, which of the following indicate worse prognosis at presentation ?

Harrison's 18th Ed. 2342

- A. Oliguria
- B. >50% crescents on renal biopsy
- C. Serum creatinine >5.7 mg/dL
- D. All of the above

In Goodpasture's syndrome, prognosis at presentation is worse if there is oliguria, advanced fibrosis or >50% crescents on renal biopsy, serum creatinine >5.7 mg/dL or a need for dialysis.

629 Patients of Goodpasture's syndrome respond to which of the following treatments ?

Harrison's 18th Ed. 2342

- A. Plasmapheresis
- B. Oral prednisone
- C. Cyclophosphamide
- D. All of the above

Patients of Goodpasture's syndrome respond to plasmapheresis, accompanied by oral prednisone and cyclophosphamide therapy.

630 Which of the following is false about Alport's syndrome ?

Harrison's 18th Ed. 2351

- A. Inherited tubulointerstitial disease
- B. Due to mutation in COL4A5 gene
- C. Hematuria, glomerulosclerosis & renal failure
- D. Usually X linked

Chronic glomerulosclerosis is a feature of Alport's syndrome. Mutations in COL4A5 (X-linked), COL4A3, or COL4A4 (both autosomal recessive) genes result in defective synthesis of collagen type IV with consequent dysfunction and inflammation of the glomerular basement membrane.

631 Which of the following is related to Alport's syndrome ?

Harrison's 18th Ed. 2351

- A. Ataxia
- B. Sensorineural deafness
- C. Alopecia
- D. Jaundice

Alport's syndrome consists of hematuria, proteinuria (<1 to 2 gram/day), progressive renal failure and sensorineural deafness.

632 Positive "oil droplet sign" in Alport's syndrome pertains to ?

N Engl J Med 2003;348:2543-56, Harrison's 18th Ed. 2351

- A. Ocular lens
- B. Tongue
- C. Nails
- D. Nose

In Alport's syndrome, lenticonus of anterior lens capsule is termed as positive "oil droplet sign".

633 Out of the following, which is the most common form of glomerulonephritis ?

Harrison's 18th Ed. 2342

- A. IgA nephropathy
- B. Focal sclerosing glomerulonephritis
- C. Rapidly progressive/crescentic glomerulonephritis
- D. Membranous glomerulonephritis

IgA nephropathy is the most common form of glomerulonephritis worldwide.

634 IgA nephropathy is also called ?

Harrison's 18th Ed. 2342

- A. Barratt disease
- B. Berger disease
- C. Tomino disease
- D. Glascock disease

IgA nephropathy (Berger disease) is a primary glomerular disease. Berger first described it in 1968.

635 Which of the following is false about IgA nephropathy ?

Harrison's 18th Ed. 2342

- A. Female preponderance
- B. Peak incidence in II & III decades of life
- C. Recurrent episodes of macroscopic hematuria
- D. Between episodes, urinalysis is normal

In IgA nephropathy, there is a male preponderance.

636 IgA nephropathy resembles which of the following diseases ?

Harrison's 18th Ed. 2342

- A. Wegener's granulomatosis

- B. Goodpasture's syndrome
- C. Henoch Schonlein purpura
- D. All of the above

Clinical and laboratory evidence suggests close similarities between Henoch-Schönlein purpura and IgA nephropathy.

637 Most IgA deposited in the kidney are derived from ?

Harrison's 17th Ed. 1788

- A. Lymph node
- B. Bone marrow
- C. Spleen
- D. Liver

638 In IgA nephropathy, deposition of IgA occurs in ?

Harrison's 18th Ed. 2342

- A. Glomerular capillaries
- B. Glomerular mesangium
- C. Glomerular basement membrane
- D. All of the above

Morphologically, IgA nephropathy is characterized by diffuse deposition of IgA in glomerular mesangium.

639 Deposits of IgA in glomerular mesangium are found in ?

Harrison's 18th Ed. 2342

- A. Leprosy
- B. Crohn's disease
- C. Chronic liver disease
- D. All of the above

640 Deposits of IgA in glomerular mesangium are found in ?

Harrison's 18th Ed. 2342

- A. Ankylosing spondylitis
- B. Idiopathic interstitial pneumonia
- C. Sjögren's syndrome
- D. All of the above

Deposits of IgA in glomerular mesangium are found in chronic liver disease, Crohn's disease, gastrointestinal adenocarcinoma, chronic obstructive bronchiectasis, idiopathic interstitial pneumonia, dermatitis herpetiformis, mycosis fungoides, leprosy, ankylosing spondylitis, relapsing polychondritis, and Sjögren's syndrome. However, IgA deposition does not produce clinically significant glomerular inflammation or renal dysfunction.

641 Which of the following is an ANCA-positive, pauci-immune glomerulonephritis ?

Harrison's 18th Ed. 2343

- A. Wegener's granulomatosis
- B. Microscopic polyangiitis
- C. Churg-Strauss syndrome
- D. All of the above

Anti-PR3 antibodies are more common in Wegener's granulomatosis & anti-MPO antibodies are more common in microscopic polyangiitis or Churg-Strauss syndrome..

642 Wegener's granulomatosis presenting without renal involvement is termed ?

Harrison's 18th Ed. 2343

- A. Wegener's disease
- B. Wegener's syndrome
- C. Isolated Wegener's granulomatosis

- D. Limited Wegener's granulomatosis

Presentation without renal involvement is termed limited Wegener's granulomatosis.

643 In microscopic polyangiitis, which of the following is uncommon ?

Harrison's 18th Ed. 2344

- A. Hematuria
- B. Proteinuria
- C. Significant lung disease or destructive sinusitis
- D. Renal involvement

Patients of microscopic polyangiitis are similar to those with Wegener's granulomatosis, except that they rarely have significant lung disease or destructive sinusitis.

644 Which of the following distinguishes Churg-Strauss Syndrome from other small-vessel vasculitis ?

Harrison's 18th Ed. 2344

- A. Pulmonary infiltrates
- B. Peripheral eosinophilia
- C. Glomerulonephritis
- D. All of the above

Churg-Strauss Syndrome is a small-vessel vasculitis associated with peripheral eosinophilia, cutaneous purpura, mononeuritis, asthma, allergic rhinitis, hypergammaglobulinemia, elevated serum IgE, and rheumatoid factor.

645 Mesangiocapillary glomerulonephritis or lobar glomerulonephritis is also called ?

Harrison's 18th Ed. 2344

- A. Focal segmental glomerulosclerosis
- B. Membranous glomerulonephritis
- C. Membranoproliferative glomerulonephritis
- D. Mesangioproliferative glomerulonephritis

Membranoproliferative glomerulonephritis (MPGN) is also called mesangiocapillary glomerulonephritis or lobar glomerulonephritis.

646 Type I Membranoproliferative glomerulonephritis (MPGN) is associated with ?

Harrison's 18th Ed. 2344

- A. Persistent hepatitis C infections
- B. Lupus
- C. Neoplastic diseases
- D. All of the above

Type I MPGN is commonly associated with persistent hepatitis C infections, autoimmune diseases like lupus or cryoglobulinemia, or neoplastic diseases.

647 Which of the following is called "dense deposit disease" ?

Harrison's 18th Ed. 2344

- A. Type I membranoproliferative glomerulonephritis
- B. Type II Membranoproliferative glomerulonephritis
- C. Type III Membranoproliferative glomerulonephritis
- D. None of the above

Low serum C₃ & dense thickening of GBM containing ribbons of dense deposits and C₃ characterize Type II MPGN, also called dense deposit disease.

648 Mesangioproliferative glomerulonephritis is seen in ?

Harrison's 18th Ed. 2344

- A. IgA nephropathy
- B. P. falciparum malaria

- C. Resolving postinfectious glomerulonephritis
- D. All of the above

Mesangioproliferative glomerulonephritis is seen in IgA nephropathy, P. falciparum malaria, resolving postinfectious glomerulonephritis, and Class II lupus nephritis.

649 Minimal change disease (MCD) is also called ?

Harrison's 18th Ed. 2345

- A. Nil disease
- B. Lipoid nephrosis
- C. Foot process disease
- D. All of the above

650 Minimal Change Disease (MCD) is associated with ?

Harrison's 18th Ed. 2345

- A. Hodgkin's disease
- B. Allergies
- C. Use of nonsteroidal anti-inflammatory agents
- D. All of the above

MCD usually presents as a primary renal disease but can be associated with Hodgkin's disease, allergies, or use of NSAIDagents.

651 Minimal Change Disease (MCD) on electron microscopy of renal biopsy consistently shows ?

Harrison's 18th Ed. 2345

- A. Mesangial proliferation
- B. Mesangial interposition
- C. Effacement of the foot process
- D. All of the above

MCD on electron microscopy of renal biopsy consistently shows an effacement of the foot process supporting epithelial podocytes with weakening of slit-pore membranes.

652 Which of the following is false about minimal change disease ?

Harrison's 18th Ed. 2345

- A. Known as nil lesion
- B. Commonest cause of nephrotic syndrome in adults
- C. Acellular urinary sediment
- D. Selective proteinuria

MCD causes 70 - 90% of nephrotic syndrome in childhood but only 10 - 15% of nephrotic syndrome in adults. In MCD, proteinuria is selective and largely composed of albumin.

653 MCD patients with steroid resistance can develop ?

Harrison's 18th Ed. 2345

- A. Focal segmental glomerulosclerosis (FSGS)
- B. Mesangioproliferative glomerulonephritis
- C. Microscopic polyangiitis
- D. Any of the above

MCD patients with steroid resistance can develop FSGS on repeat biopsy.

654 In MCD, relapses occur in what proportion of children after the first remission ?

Harrison's 18th Ed. 2345

- A. 10 - 20 %
- B. 30 - 40 %
- C. 50 - 60 %
- D. 70 - 75 %

Relapses occur in 70 - 75% of children after the first remission, and early relapse predicts multiple subsequent relapses.

655 Pathologic changes of focal segmental glomerulosclerosis (FSGS) are most prominent in glomeruli located at ?

Harrison's 18th Ed. 2345

- A. Corticomedullary junction
- B. Outer cortex
- C. Middle cortex
- D. All of the above

Pathologic changes of FSGS are most prominent in glomeruli located at corticomedullary junction.

656 What value of protein:creatinine ratio indicates nephrotic range proteinuria ?

Harrison's 17th Ed. 1790

- A. > 100 - 150 mg/mmol
- B. > 200 - 250 mg/mmol
- C. > 250 - 300 mg/mmol
- D. > 300 - 350 mg/mmol

A protein:creatinine ratio value > 300 - 350 mg/mmol indicates nephrotic range proteinuria.

657 Majority of children with nephrotic syndrome are due to ?

Harrison's 18th Ed. 2345

- A. Minimal change disease (MCD)
- B. Focal and segmental glomerulosclerosis (FSGS)
- C. Membranous glomerulopathy
- D. Membranoproliferative glomerulonephritis (MPGN)

658 Most common cause of nephrotic syndrome in the elderly is ?

Harrison's 18th Ed. 2347

- A. Minimal Change Disease (MCD)
- B. Focal segmental glomerulosclerosis (FSGS)
- C. Membranous glomerulonephritis (MGN)
- D. Mesangioproliferative glomerulonephritis

Membranous glomerulonephritis (MGN) is the most common cause of nephrotic syndrome in the elderly. It is rare in childhood.

659 Most common cause of nephrotic syndrome in black patients is ?

Korbet SM et al. Am J Kidney Dis 1996;27:647-51

- A. Minimal Change Disease (MCD)
- B. Focal segmental glomerulosclerosis (FSGS)
- C. Membranous glomerulonephritis (MGN)
- D. Mesangioproliferative glomerulonephritis

Membranous nephropathy is the most common cause of nephrotic syndrome in white, while FSGS is the most common cause in black patients.

660 Membranous glomerulonephritis (MGN) can be secondary to ?

Harrison's 18th Ed. 2347

- A. Solid tumors of breast, lung, colon
- B. Hepatitis B
- C. Malaria
- D. All of the above

MGN can be secondary to solid tumors of breast, lung, colon, hepatitis B, malaria, schistosomiasis, & lupus.

661 Which of the following causes of nephrotic syndrome has the highest incidences of renal vein thrombosis, pulmonary embolism, and deep vein thrombosis ?

Harrison's 18th Ed. 2347

- A. Minimal change disease (MCD)
- B. Focal segmental glomerulosclerosis (FSGS)
- C. Membranous glomerulonephritis (MGN)
- D. Diabetic nephropathy

Thrombotic complications occur in nephrotic syndrome. MGN has the highest incidence of renal vein thrombosis, pulmonary embolism & deep vein thrombosis. Risk of venous thrombosis is higher when serum albumin is <2 - 2.5 gram/dL.

662 How many years after the onset of clinical diabetes, morphologic changes appear in kidneys ?

Harrison's 18th Ed. 2348

- A. 1 - 2 years
- B. 3 - 4 years
- C. 5 - 7 years
- D. 7 - 9 years

Within 1 - 2 years after the onset of clinical diabetes, morphologic changes appear in the kidney.

663 In Types 1 or 2 diabetes, microalbuminuria appears how many years after the onset of diabetes ?

Harrison's 18th Ed. 2348

- A. 2 - 5
- B. 5 - 10
- C. 10 - 15
- D. 15 - 20

In Types 1 or 2 diabetes, microalbuminuria appears 5 - 10 years after its onset.

664 Which of the following histopathological findings occur in diabetic kidneys ?

Harrison's 18th Ed. 2348

- A. Thickening of GBM
- B. Expansion of mesangial matrix
- C. Nodular glomerulosclerosis
- D. All of the above

665 Kimmelstiel-Wilson lesion relates best with which of the following histopathological findings in diabetic kidney ?

Harrison's 18th Ed. 2348

- A. Thickening of GBM
- B. Expansion of mesangial matrix
- C. Nodular glomerulosclerosis
- D. Hyaline arteriosclerosis

Kimmelstiel-Wilson nodules or nodular glomerulosclerosis are eosinophilic, PAS⁺ nodules.

666 Which of the following is different between Types 1 & 2 diabetes ?

Harrison's 18th Ed. 2348

- A. Natural history of diabetic nephropathy
- B. Renal biopsy findings
- C. Onset of microalbuminuria
- D. Presence of diabetic retinopathy

Renal biopsies from patients with Types 1 and 2 diabetes are largely indistinguishable. Natural history of diabetic nephropathy in patients with Types 1 and 2 diabetes is similar. Microalbuminuria appears 5 - 10 years after the onset of Types 1 or 2 diabetes. >90% of Type 1 diabetics with

nephropathy have diabetic retinopathy while only 60% of Type 2 diabetics with nephropathy have diabetic retinopathy.

667 In microalbuminuria, the range of albuminuria is ?

Harrison's 18th Ed. 2348

- A. < 150 mg/day
- B. 20 - 200 mg/day
- C. 30 - 300 mg/day
- D. 40 - 400 mg/day

Albuminuria in the range of 30 - 300 mg/day is called microalbuminuria.

668 Dipstick positive level of albuminuria is ?

Harrison's 18th Ed. 2348

- A. > 30 mg
- B. > 150 mg
- C. > 300 mg
- D. > 500 mg

Dipstick positive level of proteinuria is > 300 mg albuminuria.

669 In diabetes, renal functions unrelentingly decline after what level of proteinuria ?

Harrison's 17th Ed. 1792

- A. > 500 mg/day
- B. > 1000 mg/day
- C. > 1500 mg/day
- D. > 2500 mg/day

670 From the earliest stages of microalbuminuria, it takes how many years to reach end-stage renal disease (ESRD)?

Harrison's 18th Ed. 2348

- A. 5 - 10 years
- B. 10 - 20 years
- C. 20 - 30 years
- D. > 30 years

After proteinuria level of >500 mg/day, renal function decline relentlessly. From the stage of microalbuminuria, it usually takes 10 - 20 years to reach ESRD.

671 Renal vein thrombosis is common in patients with nephrotic syndrome due to ?

Harrison's 17th Ed. 1792

- A. Membranous glomerulopathy
- B. Membranoproliferative glomerulonephritis
- C. Amyloidosis
- D. All of the above

672 Clinical features that suggest acute renal vein thrombosis include all except ?

Harrison's 16th Ed. 1684

- A. Sudden onset of flank or abdominal pain
- B. Gross hematuria
- C. Right-sided varicocele
- D. Acute decline in GFR

673 Congo red stains are positive ?

Harrison's 18th Ed. 2349

- A. AA & AL amyloidosis
- B. Fibrillary-Immunotactoid Glomerulopathy

- C. Light chain deposition disease
- D. All of the above

AA and AL amyloid fibrils are detectable with Congo red.

674 Which of the following best relates to Fabry's Disease ?

Harrison's 18th Ed. 2349

- A. Glucosylceramide
- B. Galactosylceramide
- C. Globotriaosylceramide
- D. Ceramide

Fabry disease is an X-linked inborn error of globotriaosylceramide metabolism that results from mutations in the α -galactosidase gene leading to excessive intracellular storage of globotriaosylceramide.

675 Clinical manifestations of Fabry's disease include all except ?

Harrison's 18th Ed. 3191

- A. Angiokeratomas
- B. Corneal and lenticular opacities
- C. Small-vessel disease of the kidney
- D. Macrocephaly

Clinically, Fabry's disease manifests as angiokeratomas (telangiectatic skin lesions), hypohidrosis, corneal and lenticular opacities, acroparesthesia, and small-vessel disease of kidney, heart, & brain.

676 Angiokeratomas is a clinical feature of ?

Harrison's 18th Ed. 3193 Table 361-1

- A. Fabry's disease
- B. β -Mannosidosis
- C. Fucosidosis
- D. All of the above

677 In Fabry's disease, angiokeratomas are most dense ?

Harrison's 18th Ed. 3191

- A. Over nape of the neck
- B. Over finger tips
- C. Between umbilicus and knees
- D. Over forehead

In Fabry's disease, angiokeratomas are most dense between umbilicus and knees "the bathing suit area" but may occur anywhere, including mucosal surfaces.

678 "Zebra bodies" is a histopathological hallmark of ?

Harrison's 18th Ed. 2350

- A. Fabry's disease
- B. β -Mannosidosis
- C. Fucosidosis
- D. All of the above

In Fabry's disease, electron microscopy of renal biopsy shows enlarged glomerular visceral epithelial cells packed with vacuoles containing globotriaosylceramide in parallel arrays called zebra bodies.

679 In Fabry's disease, neutral glycosphingolipids accumulate in which organelle of glomerular cells ?

Harrison's 18th Ed. 3191

- A. Mitochondria
- B. Golgi apparatus
- C. Lysosome
- D. Nucleus

680 Which of the following statements about 'Nail-patella syndrome' is false ?

N Engl J Med 2006;354:1387-401, Harrison's 18th Ed. 2351

- A. It is an autosomal dominant disease
- B. Abnormal gene is located on long arm of chromosome 9
- C. Multiple osseous abnormalities primarily affect elbows and knees, and nail dysplasia
- D. None of the above

681 Which of the following statements about 'Nail-patella syndrome' is false ?

N Engl J Med 2006;354:1387-401, Harrison's 18th Ed. 2351

- A. Glomerular basement membrane is thickened with splitting and fibrillar collagen deposits
- B. Caused by loss-of-function mutations in *LMX1B*
- C. *LMX1B* is expressed in kidney primarily by podocytes
- D. None of the above

682 After what duration does HIV-associated nephropathy begin ?

Harrison's 17th Ed. 1796

- A. ~ 3 months
- B. ~ 6 months
- C. ~ 1 year
- D. ~ 2.5 years

HIV-associated nephropathy begins ~ 2.5 years after HIV infection.

683 HIV infection is most commonly associated with which of the following glomerulopathies ?

Harrison's 18th Ed. 2353

- A. Aggressive focal segmental glomerulosclerosis
- B. Acute diffuse proliferative glomerulonephritis
- C. IgA nephropathy
- D. Membranous glomerulopathy

684 Term HIV-associated nephropathy (HIVAN) is used for ?

Harrison's 18th Ed. 2353

- A. Aggressive focal segmental glomerulosclerosis
- B. Acute diffuse proliferative glomerulonephritis
- C. IgA nephropathy
- D. Membranous glomerulopathy

685 Which of the following is false for HIV-associated nephropathy (HIVAN) ?

Harrison's 18th Ed. 2353

- A. May be the first manifestation of HIV infection
- B. More common in blacks
- C. More frequent in intravenous drug abusers
- D. Slow clinical course

686 HIV patients with FSGS present with nephrotic-range proteinuria & hypoalbuminemia but without ?

Harrison's 18th Ed. 2353

- A. Hypertension
- B. Edema
- C. Hyperlipidemia
- D. All of the above

HIV patients with FSGS typically present with nephrotic-range proteinuria and hypoalbuminemia, but without hypertension, edema, or hyperlipidemia.

687 Which of the following is an inflammatory glomerulopathy ?

Harrison's 16th Ed. 1674

- A. Focal proliferative glomerulonephritis
- B. Diffuse proliferative glomerulonephritis
- C. Crescentic glomerulonephritis
- D. All of the above

688 Which of the following is false about inflammatory glomerulopathy ?

Harrison's 16th Ed. 1674

- A. Nephrotic-type
- B. RBC in urine
- C. RBC cast in urine
- D. Leucocyte in urine

689 Nephrotic-range proteinuria can be found in all except ?

Harrison's 16th Ed. 1674

- A. Membranous glomerulopathy
- B. Minimal change disease (MCD)
- C. Focal proliferative glomerulonephritis
- D. Focal and segmental glomerulosclerosis (FSGS)

690 Which of the following cells of kidney do not proliferate ?

Harrison's 16th Ed. 1678

- A. Mesangial cells
- B. Endothelial cells
- C. Visceral epithelial cells
- D. All of the above

691 'Crescents' are composed of ?

Harrison's 16th Ed. 1678

- A. Infiltrating monocytes
- B. Proliferating parietal epithelial cells
- C. Fibrin
- D. All of the above

692 Intrarenal vasoconstrictors include all except ?

Harrison's 16th Ed. 1678

- A. Leukotrienes
- B. Nitric oxide
- C. Thromboxanes
- D. Platelet-activating factor

693 Intrarenal vasoconstrictors include all except ?

Harrison's 16th Ed. 1678

- A. Endothelins
- B. Prostacyclin
- C. Thromboxanes
- D. Platelet-activating factor

694 Which of the following is most common in 'acute nephritic syndrome' ?

Harrison's 16th Ed. 1680

- A. Immune-complex glomerulonephritis

- B. Anti-GBM disease
- C. Pauci-immune glomerulonephritis
- D. None of the above

695 Which of the following is least common among patients with RPGN ?

Harrison's 16th Ed. 1680

- A. Immune-complex glomerulonephritis
- B. Anti-GBM disease
- C. Pauci-immune glomerulonephritis
- D. None of the above

696 Serologic markers that predict the immunofluorescence microscopy findings in nephritic syndrome and RPGN include ?

Harrison's 16th Ed. 1680

- A. Serum C3 level
- B. Titers of anti-GBM antibody
- C. Titers of ANCA
- D. All of the above

697 Which of the following is true for Henoch Schonlein purpura ?

Harrison's 16th Ed. 1680

- A. Normal complement levels
- B. Negative anti-GBM serology
- C. Negative ANCA serology
- D. All of the above

698 Which of the following is true for 'pauci-immune glomerulonephritis' ?

Harrison's 16th Ed. 1680

- A. Absent circulating anti-GBM autoantibodies
- B. Normal serum complement levels
- C. Circulating ANCA present
- D. All of the above

699 Which of the following is a type of pauci-immune glomerulonephritis ?

Harrison's 16th Ed. 1683

- A. Idiopathic renal-limited crescentic glomerulonephritis
- B. Microscopic polyangiitis nodosa (PAN)
- C. Wegener's granulomatosis
- D. All of the above

700 Which of the following statements is false ?

Harrison's 16th Ed. 1684

- A. Glomerular proteinuria results from leakage of plasma proteins through a perturbed glomerular filtration barrier
- B. Tubular proteinuria results from failure of tubular reabsorption of low-molecular-weight plasma proteins
- C. Overflow proteinuria results from filtration of proteins, usually immunoglobulin light chains, that are present in excess in circulation
- D. None of the above

701 Which of the following statements is false ?

Harrison's 16th Ed. 1684

- A. Proteinuria > 150 mg per 24 h is abnormal

- B. Tubular proteinuria never exceeds 2 gram per day
C. Sulfosalicylic acid precipitation test detects both albumin and light chains
D. None of the above
- 702 Proteinuria develops after what duration of gold therapy ?**
Harrison's 16th Ed. 1691
A. 1 to 2 months
B. 2 to 4 months
C. 4 to 6 months
D. 6 to 8 months
- 703 Renal biopsy typically reveals which of the following in patients with proteinuria following gold therapy ?**
Harrison's 16th Ed. 1691
A. Rapidly progressive glomerulonephritis
B. Pauci-immune necrotizing glomerulonephritis
C. Focal segmental glomerulosclerosis
D. Membranous glomerulopathy
- 704 Morphologic lesion in ciprofloxacin induced glomerular disease is ?**
Harrison's 16th Ed. 1691
A. Rapidly progressive glomerulonephritis
B. Pauci-immune necrotizing glomerulonephritis
C. Focal segmental glomerulosclerosis
D. Membranous glomerulopathy
- 705 Morphologic lesion in rifampin induced glomerular disease is ?**
Harrison's 16th Ed. 1691
A. Rapidly progressive glomerulonephritis
B. Pauci-immune necrotizing glomerulonephritis
C. Focal segmental glomerulosclerosis
D. Membranous glomerulopathy
- 706 Morphologic lesion in warfarin induced glomerular disease is ?**
Harrison's 16th Ed. 1691
A. Rapidly progressive glomerulonephritis
B. Pauci-immune necrotizing glomerulonephritis
C. Focal segmental glomerulosclerosis
D. Membranous glomerulopathy
- 707 Morphologic lesion in thiazide induced glomerular disease is ?**
Harrison's 16th Ed. 1691
A. Rapidly progressive glomerulonephritis
B. Pauci-immune necrotizing glomerulonephritis
C. Focal segmental glomerulosclerosis
D. Proliferative glomerulonephritis with vasculitis
- 708 Glomerular lesion associated with HBV infection include ?**
Harrison's 16th Ed. 1692
A. Membranous glomerulopathy
B. MPGN
C. IgA nephropathy
D. All of the above
- 709 Which out of the following is the most common glomerular lesion associated with HBV infection ?**
Harrison's 16th Ed. 1692
A. Membranous glomerulopathy
B. MPGN
C. IgA nephropathy
D. Essential mixed cryoglobulinemia
- 710 HCV-induced immune-complex disease is associated with which of the following ?**
Harrison's 16th Ed. 1693
A. Cryoglobulinemic proliferative glomerulonephritis
B. MPGN
C. Membranous glomerulopathy
D. All of the above
- 711 Which of the following glomerulopathies is most commonly associated with Hodgkin's lymphoma ?**
Harrison's 18th Ed. 2345
A. FSGS
B. MCD
C. MPGN
D. Membranous glomerulopathy
- 712 Amyloidosis is more frequent in patients of rheumatoid arthritis with ?**
Harrison's 16th Ed. 1694
A. Long duration (> 10 years)
B. Circulating rheumatoid factor
C. Destructive arthropathy
D. All of the above

Chapter 284. Polycystic Kidney Disease and Other Inherited Tubular Disorders

- 713 Which of the following statements is false about polycystic kidney disease ?**
Harrison's 18th Ed. 2355
A. ADPKD is seen predominantly in childhood
B. ARPKD is mainly a disease of adults
C. They infrequently cause kidney failure
D. All of the above

Autosomal dominant polycystic kidney disease (ADPKD) is seen predominantly in adults, whereas autosomal recessive polycystic kidney disease (ARPKD) is mainly a disease of childhood. They frequently causes kidney failure.

- 714 Which of the following statements about 'Autosomal dominant polycystic kidney disease (ADPKD)' is false ?**
Harrison's 17th Ed. 1797
A. ADPKD-1 gene is on chromosome 16p13.3
B. ADPKD-2 gene is on chromosome 4q21-23
C. Cysts are distributed throughout cortex & medulla
D. Erythropoietin production is low

715 Which of the following statements about 'Autosomal dominant polycystic kidney disease (ADPKD)' is false ?

Harrison's 18th Ed. 2358

- A. Standard diagnostic criteria is at least 3 to 5 cysts in each kidney
- B. Cysts may be found in brain, thyroid
- C. Mitral valve prolapse found in 25% of patients
- D. Intracranial aneurysms present in 5 to 10 % of patients

716 Which of the following is a PKD-1 encoded protein ?

Harrison's 18th Ed. 2355

- A. Fibrocystin
- B. Polycystin-1
- C. Caveolin 3
- D. FMR-1 protein

ADPKD results from mutations in either PKD-1 (85% of cases) or PKD-2 gene. PKD-1 encodes polycystin-1, whereas PKD-2 gene product is polycystin-2.

717 In ADPKD, cyst formation begins ?

Harrison's 18th Ed. 2355

- A. In utero
- B. In early childhood
- C. In adolescence
- D. In adulthood

In ADPKD, cyst formation begins in utero.

718 What percentage of total nephrons are involved in ADPKD ?

Harrison's 18th Ed. 2355

- A. < 1 %
- B. < 2 %
- C. < 3 %
- D. < 5 %

In ADPKD, <5% of total nephrons are involved.

719 Extrarenal manifestation of ADPKD is ?

Harrison's 18th Ed. 2356

- A. Intracranial aneurysm
- B. Cardiac valvular abnormalities
- C. Colonic diverticulae
- D. All of the above

Intracranial aneurysm, cardiac valvular abnormalities (MVPS, AR), hepatic cysts, colonic diverticulae, inguinal hernias occur with a higher frequency than in the general population in ADPKD.

720 In ADPKD, cysts can also develop in ?

- A. Liver
- B. Pancreas
- C. Arachnoid membranes
- D. All of the above

Cysts can also develop in liver, pancreas, spleen, arachnoid membranes & seminal vesicles in men.

721 Diagnostic criteria for ADPKD in young include ?

Harrison's 18th Ed. 2358

- A. ≥ 2 in one & 1 cysts in other kidney
- B. ≥ 3 in one & 1 cysts in other kidney
- C. ≥ 2 in one & 2 cysts in other kidney
- D. ≥ 3 in one & 2 cysts in other kidney

722 Diagnostic criteria for ADPKD in > 60 year old include ?

Harrison's 18th Ed. 2358

- A. ≥ 1
- B. ≥ 2
- C. ≥ 3
- D. ≥ 4

Diagnostic criteria for ADPKD require two or more cysts in one kidney and at least one cyst in contralateral kidney in young subjects, but four or more in subjects older than 60 years.

723 Autosomal recessive polycystic kidney disease (ARPKD) gene is called ?

Harrison's 18th Ed. 2358

- A. ARPKD-1
- B. ARPKD-2
- C. PKHD1
- D. PKHD2

ARPKD gene on chromosome 6p21 is called PKHD1 (polycystic kidney & hepatic disease 1) gene.

724 Protein expressed by PKHD1 is termed ?

Harrison's 18th Ed. 2358

- A. Nephrocystin
- B. Inversin
- C. Fibrocystin
- D. Polycystin-3

Protein expressed by PKHD1 is termed fibrocystin (polyductin).

725 Fibrocystin is found in ?

Harrison's 18th Ed. 2358

- A. Cortical & medullary collecting ducts
- B. Thick ascending limb of Henle's loop
- C. Biliary & pancreatic duct epithelia
- D. All of the above

Fibrocystin (polyductin) is found in cortical & medullary collecting ducts & thick ascending limb of Henle's loop in kidney and in biliary & pancreatic duct epithelia.

726 Which of the following statements about 'Autosomal recessive polycystic kidney disease (ARPKD)' is false ?

Harrison's 18th Ed. 2359

- A. Distal tubules & collecting ducts are dilated
- B. Portal hypertension & esophageal varices are frequent
- C. Unilateral abdominal mass is common
- D. Death in neonates is due to pulmonary hypoplasia

Enlarged kidneys are detected soon after birth as bilateral abdominal masses.

727 Which of the following is the most common genetic cause of ESRD in childhood ?

Harrison's 18th Ed. 2359

- A. Autosomal recessive polycystic kidney disease
- B. Medullary sponge kidney (MSK)
- C. Bartter's syndrome
- D. Nephronophthisis (NPHP)

Nephronophthisis (NPHP) is the most common genetic cause of ESRD in childhood & adolescence.

728 Senior-Loken syndrome, besides juvenile nephronophthisis, best relates to ?

Harrison's 18th Ed. 2359

- A. Intracranial aneurysm
- B. Retinitis pigmentosa
- C. Colonic diverticulae
- D. All of the above

When juvenile NPHP has retinitis pigmentosa as an extrarenal manifestation, the syndrome is called Senior-Loken syndrome.

729 Presence of hyperuricemia and gout point towards the diagnosis of which of the following ?

Harrison's 18th Ed. 2359

- A. Autosomal recessive polycystic kidney disease
- B. Medullary cystic kidney disease 2
- C. Bartter's syndrome
- D. Nephronophthisis (NPHP)

Most patients with medullary cystic kidney disease 2 (MCKD2) have severe hyperuricemia and precocious onset of gout.

730 Renal tuberos sclerosis (TS) may occur in which of the following forms ?

Harrison's 18th Ed. 2360

- A. Renal cysts
- B. Renal angiomyolipomas
- C. Renal cell carcinoma
- D. All of the above

Renal TS occurs as renal cysts, renal angiomyolipomas & renal cell carcinoma.

731 Deafness is invariably associated with which type of Bartter's syndrome ?

Harrison's 18th Ed. 2360

- A. Type 1
- B. Type 2
- C. Type 3
- D. Type 4

Bartter type 4 is due to mutations in barttin which is also expressed in inner ear. Deafness is invariably associated with Bartter type 4.

732 Which of the following is false for Bartter's syndrome ?

Harrison's 18th Ed. 2360

- A. Inherited as autosomal recessive trait
- B. Due to abnormality in renal tubule transport proteins
- C. Prostaglandin E production is low
- D. Metabolic abnormalities similar to diuretic abuse

In Bartter's syndrome, RAS activation causes increased levels of cyclooxygenase 2 (COX-2) & marked overproduction of renal prostaglandins (PGE₂).

733 Hyperprostaglandin E syndrome is related to ?

Harrison's 18th Ed. 2360

- A. Bartter's syndrome
- B. Gitelman's syndrome
- C. Liddle's syndrome
- D. All of the above

Hyperprostaglandin E syndrome is a severe form of Bartter's syndrome. Neonates present with pronounced volume depletion, fever, vomiting and diarrhea from PGE₂ overproduction.

734 Protein affected in Bartter's syndrome is ?

Harrison's 18th Ed. 2360

- A. NKCC2
- B. ROMK
- C. Barttin
- D. All of the above

Bartter's syndrome is the result of mutations in ion transport proteins in TAL. Type 1 is due to apical loop-diuretic sensitive sodium-potassium-chloride co-transporter protein NKCC2, type 2 is due to apical potassium channel ROMK, type 3 is due to basolateral chloride channel ClC-Kb and Bartter type 4 results from mutations in barttin, an essential subunit of ClC-Ka and ClC-Kb that enables transport of the chloride channels to the cell surface.

735 Which of the following electrical situations occur in Bartter's syndrome ?

Harrison's 18th Ed. 2360

- A. Loss of lumen-positive electrical transport potential
- B. Loss of lumen-negative electrical transport potential
- C. Loss of cell-positive electrical transport potential
- D. Loss of cell-negative electrical transport potential

In Bartter's syndrome, loss of lumen-positive electrical transport potential that normally drives paracellular reabsorption of sodium, calcium & magnesium causes NaCl wasting, hypercalciuria & mild hypomagnesemia.

736 Gitelman's syndrome is due to mutations in ?

Harrison's 18th Ed. 2361

- A. Apical loop-diuretic sensitive Na-K-Cl co-transporter
- B. Apical potassium channel
- C. Thiazide-sensitive Na-Cl co-transporter (NCCT)
- D. Basolateral chloride channel ClC-Kb

Gitelman's syndrome is due to mutations in thiazide-sensitive Na-Cl co-transporter (NCCT) in DCT.

737 Gitelman's syndrome is distinguished from Bartter's syndrome by ?

Harrison's 18th Ed. 2361

- A. Hypokalemia
- B. Metabolic alkalosis
- C. Elevated renin and aldosterone levels
- D. Hypomagnesemia

Severe magnesium wasting occurs in Gitelman's syndrome.

738 Gitelman's syndrome is distinguished from Bartter's syndrome by ?

Harrison's 18th Ed. 2361

- A. Hypokalemia
- B. Metabolic alkalosis
- C. Elevated renin and aldosterone levels
- D. Hypocalciuria

Gitelman's syndrome is distinguished from Bartter's syndrome by presence of severe hypomagnesemia & hypocalciuria. Hypercalciuria marked overproduction of renal prostaglandins (PGE₂) occurs in Bartter's syndrome.

739 Carpopedal spasm, cramps & tetany are clinical features of ?

Harrison's 18th Ed. 2361

- A. Bartter's syndrome
- B. Gitelman's syndrome
- C. Liddle's syndrome
- D. Von Hippel-Lindau Disease

Gitelman's syndrome is characterized by hypocalciuria, severe hypomagnesemia resulting in carpopedal spasm, cramps and tetany. Autosomal recessive familial hypomagnesemia with hypercalciuria and nephrocalcinosis (FHHNC), autosomal recessive hypomagnesemia with secondary hypocalcemia (HSH), autosomal dominant hypomagnesemia, and autosomal dominant hypoparathyroidism can also produce such presentation.

740 Which of the following best relate to Liddle's syndrome ?

Harrison's 18th Ed. 2363

- A. Unregulated sodium reabsorption
- B. Overactive ENaC in cortical collecting duct
- C. Chloride-independent sodium reabsorption
- D. All of the above

741 Which of the following is false for Liddle's syndrome ?

Harrison's 18th Ed. 2363

- A. Hypertension
- B. Hypokalemia
- C. High aldosterone levels
- D. Metabolic alkalosis

Liddle's syndrome mimics a state of aldosterone excess. Features include early and severe hypertension, hypokalemia & metabolic alkalosis. Plasma aldosterone & renin levels are low.

742 Which of the following drug is ineffective in treatment of Liddle's syndrome ?

Harrison's 18th Ed. 2363

- A. Spironolactone
- B. Amiloride
- C. Triamterene
- D. All of the above

Amiloride or triamterene block ENaC and, combined with salt restriction, provide effective therapy for hypertension and hypokalemia.

743 Polyuria is a prominent feature of all except ?

Harrison's 18th Ed. 2361

- A. ADPKD
- B. Medullary cystic kidney disease (MCKD)
- C. Bartter's Syndrome
- D. Gitelman's syndrome

744 During antenatal period, fetal polyuria causes maternal polyhydramnios and premature labor in ?

Harrison's 18th Ed. 2361

- A. ADPKD
- B. Medullary cystic kidney disease (MCKD)
- C. Bartter's syndrome
- D. Gitelman's syndrome

In antenatal period, fetal polyuria may cause maternal polyhydramnios & premature labor in Bartter's syndrome.

745 ENaC best relates to ?

Harrison's 18th Ed. 2362 Table 284-3

- A. Amiloride-sensitive epithelial sodium channel
- B. Thiazide-sensitive Na-Cl co-transporter
- C. Na-K-2Cl co-transporter
- D. Sodium-bicarbonate co-transporter

ENaC is an amiloride-sensitive epithelial sodium channel.

746 Which of the following is false about hereditary nephrogenic diabetes insipidus (NDI) ?

Harrison's 18th Ed. 2363

- A. High plasma levels of vasopressin
- B. Hyponatremia
- C. Polyuria
- D. Seizures & mental retardation

Hereditary nephrogenic diabetes insipidus (NDI) presents in infancy with severe vasopressin-resistant polyuria, dehydration, failure to thrive, and dilute urine despite the presence of hypernatremia.

747 Which of the following renal tubular acidosis type is rare ?

Harrison's 18th Ed. 2363

- A. 1
- B. 2
- C. 3
- D. 4

748 Serum anion gap is normal in which of the following renal tubular acidosis (RTA) type ?

Harrison's 18th Ed. 2363

- A. 1
- B. 2
- C. 4
- D. All of the above

Inherited renal tubular acidosis presents as nonanion gap (hyperchloremic) metabolic acidosis from proximal tubular bicarbonate wasting or impaired distal net acid excretion.

749 Hereditary diseases that cause type 1 RTA include ?

Harrison's 16th Ed. 1699

- A. Ehler-Danlos syndrome
- B. Fabry's disease
- C. Wilson's disease
- D. All of the above

750 Systemic disorder that cause type 1 RTA include ?

Harrison's 16th Ed. 1699

- A. Sjogren's syndrome
- B. Chronic active hepatitis
- C. Lupus
- D. All of the above

751 Which of the following inherited disorders produce Type 2 (Proximal) RTA ?

Harrison's 18th Ed. 2364

- A. Wilson's disease
- B. Cystinosis
- C. Glycogen storage disease type I
- D. All of the above

Inherited disorders that produce Type 2 (Proximal) RTA are Wilson's disease, cystinosis, tyrosinemia, galactosemia, hereditary fructose intolerance, glycogen storage disease type I, and Lowe's syndrome.

752 Serum potassium is high in which of the following RTA ?

Harrison's 18th Ed. 2364

- A. 1
- B. 2

- C. 4
D. All of the above

Type 4 RTA is acquired in association with moderate renal dysfunction & is characterized by hyperkalemia.

753 Drug-induced type 4 RTA is due to which of the following drugs ?

Harrison's 17th Ed. 1805

- A. NSAIDs
B. ACE inhibitors
C. Heparin
D. All of the above

754 Which of the following statements is false ?

Harrison's 18th Ed. 2364

- A. Type 1 RTA is due to impaired H^+ ion secretion or HCO_3^- reabsorption in distal nephron
B. Type 2 RTA is due to impaired HCO_3^- reabsorption in proximal tubule
C. Type 1 RTA may present as "marble-brain disease"
D. None of the above

755 Marble-brain disease consists of ?

Harrison's 18th Ed. 2364

- A. Osteopetrosis
B. Short stature
C. Mental retardation
D. All of the above

756 Marble-brain disease is due to mutations in ?

Harrison's 18th Ed. 2364

- A. CA2
B. SLC3A1
C. SLC6A19
D. CLCN5

Marble-brain disease consists of osteopetrosis, short stature, and mental retardation with dRTA. It is due to mutations in CA2 (carbonic anhydrase II).

757 Which of the following is not a feature of Type 1 (Distal) RTA ?

Harrison's 18th Ed. 2364

- A. Hypokalemia
B. Hypocitratemia
C. Hypocalciuria
D. Rickets or osteomalacia

Type 1 (Distal) RTA presents as hypokalemia, hypocitratemia, hypercalciuria, nephrocalcinosis, nephrolithiasis. Chronic untreated acidosis may lead to rickets or osteomalacia.

758 In Type 1 (Distal) RTA, patients fail to acidify urine to pH ?

Harrison's 18th Ed. 2364

- A. < 5.5
B. < 6.5
C. < 7.0
D. < 7.5

In Type 1 (Distal) RTA, patients fail to acidify urine to pH < 5.5 even after acid loading with oral ammonium chloride or calcium chloride.

759 Which of the following stone is formed in Type 1 (Distal) RTA ?

Harrison's 18th Ed. 2364

- A. Uric acid
B. Cystine
C. Calcium oxalate
D. Calcium phosphate

Increased proximal citrate absorption leads to hypocitratemia and together with hypercalciuria predisposes to nephrocalcinosis & calcium phosphate stone formation.

760 Bicarbonate replacement dose in Type 1 (Distal) RTA is ?

Harrison's 18th Ed. 2364

- A. 0.2 - 1 mmol/kg/day
B. 1 - 3 mmol/kg/day
C. 3 - 5 mmol/kg/day
D. 5 - 10 mmol/kg/day

In Type 1 (Distal) RTA, bicarbonate replacement dose is 1 - 3 mmol/kg/day in divided doses. While, in Type 2 (proximal) RTA the dose is 5 - 15 mmol/kg/day along with supplemental potassium & vitamin D.

761 Renal glucosuria is due to mutations in which gene ?

Harrison's 18th Ed. 2364

- A. SLC6A19
B. SLC5A2
C. SLC3A1
D. SLC7A9

Renal isolated glucosuria with normal blood glucose concentration is due to mutations in SLC5A2 gene that encodes sodium-glucose co-transporter SGLT2 in the proximal renal tubule.

762 Low-molecular-weight proteinuria is a feature of ?

Harrison's 18th Ed. 2365

- A. Renal glucosuria
B. Hartnup Disease
C. Cystinuria
D. Dent's disease

Low-molecular-weight proteinuria, hypercalciuria, nephrocalcinosis and nephrolithiasis are features of Dent's disease.

763 Cerebellar ataxia & pellagra-like skin lesions are a feature of ?

Harrison's 18th Ed. 2365

- A. Renal glucosuria
B. Hartnup Disease
C. Cystinuria
D. Dent's disease

In Hartnup disease, tryptophan is retained in intestinal lumen & converted to indole compounds that are toxic to CNS. Consequent niacin deficiency leads to skin manifestations.

764 Inherited systemic disorders associated with Fanconi syndrome include ?

Harrison's 18th Ed. 2365

- A. Wilson's disease
B. Galactosemia
C. Tyrosinemia
D. All of the above

765 Acquired disorders associated with Fanconi syndrome include ?

Harrison's 17th Ed. 1805

- A. Multiple myeloma

- B. Heavy metal toxicity
- C. Chemotherapeutic drugs
- D. All of the above

Chapter 285. Tubulointerstitial Diseases of the Kidney

766 Tubulointerstitial disease affecting predominantly medullary & papillary structures is ?

Harrison's 17th Ed. 1807

- A. Analgesic nephropathy
- B. Lead nephropathy
- C. Plasma Cell Dyscrasias
- D. All of the above

Tubulointerstitial diseases that predominantly affect medullary & papillary structures are analgesic nephropathy & sickle cell disease.

767 "Ring sign" on the pyelogram is pathognomonic of ?

Harrison's 17th Ed. 1807

- A. Polycystic kidney disease
- B. Papillary necrosis
- C. Transitional cell carcinoma
- D. Medullary sponge kidney

"Ring sign" (radiolucent sloughed papilla surrounded by radiodense contrast material in calyx) on pyelogram is pathognomonic of papillary necrosis due to analgesic nephropathy. CT reveals papillary calcifications surrounding the central sinus complex in a "garland" pattern.

768 Which of the following is a characteristic finding in patients with chronic lead nephropathy ?

Harrison's 17th Ed. 1807

- A. Hypokalemia
- B. Hypercalcemia
- C. Hyperuricemia
- D. Hyponatremia

Patients with chronic lead nephropathy are characteristically hyperuricemic due to increased reabsorption of filtered urate leading to acute gouty arthritis called saturnine gout.

769 Which of the following is not a feature of lead intoxication ?

Harrison's 17th Ed. 1808

- A. Progressive renal failure
- B. Gout
- C. Dyslipidemia
- D. Hypertension

Chapter 286. Vascular Injury to the Kidney

770 Which of the following threaten blood supply of the kidney ?

Harrison's 18th Ed. 2375

- A. Fibromuscular diseases
- B. Inflammatory disorders
- C. Primary hematologic disorders
- D. All of the above

Disorders that threaten blood supply of kidney include large vessel atherosclerosis, fibromuscular diseases, embolic, inflammatory, and primary hematologic disorders.

771 Large-vessel renal artery occlusive disease result most commonly from ?

Harrison's 18th Ed. 2375

- A. Extrinsic compression of the vessel
- B. Fibromuscular dysplasias
- C. Atherosclerotic disease
- D. None of the above

Large vessel renal artery occlusive disease results most commonly from atherosclerotic disease and also from extrinsic compression of the vessel and fibromuscular dysplasias.

772 What percentage of cases of hypertension are caused by renal artery stenosis (RAS) ?

Harrison's 17th Ed. 1811

- A. ~ 1 %
- B. ~ 5 %
- C. ~ 7 %
- D. ~ 10 %

~5% of cases of hypertension are caused by renal artery stenosis (RAS).

773 Which of the following is not a characteristic of renal artery stenosis due to fibromuscular dysplasia ?

N Engl J Med 2009;361:1972-8

- A. Usually young (<40 yr)
- B. Usually male
- C. Middle or distal lesion location
- D. Good BP response to revascularization

Patients of RAS due to fibromuscular dysplasia are usually female (15 - 50 yrs).

774 The clinical clues for the diagnosis of renal-artery stenosis include all except ?

N Engl J Med 2009;361:1972-8

- A. Onset of stage 2 hypertension >30 years of age
- B. Absence of family history of hypertension
- C. Hypertension associated with renal insufficiency
- D. Renal function worsens after ACE inhibitors

Classic clinical clues that suggest the diagnosis of RAS are onset of stage 2 hypertension (BP>160/100 mm Hg) after 50 years of age, absence of family history of HTN, HTN with renal insufficiency, renal function worsens after administration of renin-angiotensin-aldosterone system blocker, HTN with repeated hospital admissions for heart failure, and drug-resistant hypertension.

775 Which of the following diagnostic imaging tests for renal-artery stenosis provide best image quality & anatomical information ?

N Engl J Med 2009;361:1972-8

- A. Duplex ultrasonography
- B. Magnetic resonance angiography
- C. Computed tomographic angiography
- D. Digital-subtraction angiography

776 Which of the following is termed as renal enzyme ?

Harrison's 17th Ed. 1811

- A. Serum aspartate aminotransferase (AST)
- B. Serum lactate dehydrogenase (LDH)

- C. Serum alkaline phosphatase
- D. All of the above

Renal enzymes elevated in renal infarction are aspartate aminotransferase (AST), lactate dehydrogenase (LDH), and alkaline phosphatase.

777 Most common cause of cholesterol crystal embolization in atheroembolic renal disease is ?

Harrison's 17th Ed. 1812

- A. Vascular surgery
- B. Arteriography
- C. Anticoagulation with heparin
- D. Thrombolytic therapy

Arteriographic procedures are the most common cause of cholesterol crystal embolization in atheroembolic renal disease.

778 Which of the following is rare in cholesterol crystal embolization in atheroembolic renal disease ?

Harrison's 17th Ed. 1812

- A. Livedo reticularis
- B. "Purple" toes
- C. Toe gangrene
- D. Renal infarction

Renal infarction secondary to cholesterol embolization is rare.

779 Lab. findings in cholesterol crystal embolization in atheroembolic renal disease include all except ?

Harrison's 17th Ed. 1812

- A. Rising blood urea nitrogen & creatinine
- B. Eosinopenia
- C. Anemia
- D. Hypocomplementemia

Lab. findings in cholesterol crystal embolization in atheroembolic renal disease include rising BUN & creatinine, eosinophilia, eosinophiluria, leukocytosis, elevated ESR, anemia & hypocomplementemia.

780 Which of the following approaches in atheroembolic renal disease is not beneficial ?

Harrison's 17th Ed. 1812

- A. Anticoagulation
- B. Cholesterol-lowering agents
- C. Steroid therapy
- D. All of the above

Withdrawal of anticoagulation may be beneficial.

781 In 'Benign arteriolar nephrosclerosis' the characteristic pathology 'Hyaline arteriosclerosis' is in ?

Harrison's 17th Ed. 1813

- A. Afferent arterioles
- B. Capillaries
- C. Efferent arterioles
- D. All of the above

Characteristic pathology of arteriolar nephrosclerosis is in afferent arterioles that have thickened walls & narrowing of vascular lumen due to deposition of homogeneous eosinophilic material (hyaline arteriosclerosis) resulting in ischemic injury to glomeruli & tubules.

782 'Flea-bitten appearance' of kidneys is seen in ?

Harrison's 17th Ed. 1813

- A. Malignant arteriolar nephrosclerosis

- B. Hemolytic uremic syndrome (HUS)
- C. Thrombotic thrombocytopenic purpura (TTP)
- D. All of the above

Flea-bitten appearance of kidneys is due to hemorrhages in surface capillaries.

783 Which of the following is false regarding "onion-skin lesion" ?

Harrison's 17th Ed. 1813

- A. Seen in malignant arteriolar nephrosclerosis
- B. Involves interlobular arteries
- C. Hyperplastic arteriolitis
- D. None of the above

784 In the natural course of malignant hypertension, death is almost always due to ?

Harrison's 17th Ed. 1813

- A. CHF
- B. Ischemic heart disease
- C. Cerebrovascular accident
- D. Uremia

Malignant hypertension is a medical emergency. Its natural course includes a death rate of 80 - 90% within 1 year of onset, almost always due to uremia.

785 Which of the following antibodies are strongly associated with scleroderma renal disease ?

Harrison's 17th Ed. 1814

- A. P-ANCA
- B. Smooth-muscle antibody (SMA)
- C. anti-Jo-1 antibody
- D. Anti-RNA POL3

Anti-RNA POL3 antibodies are strongly associated with scleroderma renal disease

786 Scleroderma renal crisis (SRC) includes ?

Harrison's 17th Ed. 1814

- A. Malignant hypertension
- B. Rapid deterioration in renal function
- C. Microangiopathic hemolytic anemia
- D. All of the above

SRC is a rapid deterioration in renal function, usually accompanied by malignant hypertension, oliguria, proteinuria, fluid retention, microangiopathic hemolytic anemia, and CNS involvement.

787 Acute bilateral cortical necrosis is associated with ?

Harrison's 17th Ed. 1815

- A. Septic abortion
- B. Abruptio placentae
- C. Preeclampsia
- D. All of the above

Acute bilateral cortical necrosis is associated with septic abortions, abruptio placentae & preeclampsia.

Chapter 287. Nephrolithiasis

788 The element in 'Struvite' is ?

Harrison's 17th Ed. 1815

- A. Calcium

- B. Aluminium
- C. Magnesium
- D. Zinc

The chemical formula of struvite is $MgNH_4PO_4$

789 Causes of 'Hypercalciuria' include all except ?

Harrison's 17th Ed. 1816 Table 281-1

- A. Hypothyroidism
- B. Cushing syndrome
- C. Sarcoidosis
- D. Immobilization

790 Causes of 'Hypercalciuria' include ?

Harrison's 17th Ed. 1816 Table 281-1

- A. Vitamin D intoxication
- B. Rapidly progressive bone disease
- C. Paget's disease
- D. All of the above

Hyperthyroidism, Cushing syndrome, sarcoidosis, malignant tumors, immobilization, vitamin D intoxication, rapidly progressive bone disease, and Paget's disease cause hypercalciuria.

791 Which of the following is false about 'Struvite stones' ?

Harrison's 17th Ed. 1816

- A. Occur mainly in men
- B. Occur in patients with chronic bladder catheterization
- C. Due to UTI with urease-producing bacteria
- D. May grow to produce a "staghorn" appearance

Struvite stones occur mainly in women.

792 Basic constituents of most kidney stones include all except ?

Harrison's 16th Ed. 1710

- A. Alumina
- B. Uric acid
- C. Cystine
- D. Struvite

793 Urine crystals that are rectangular prisms and resemble 'coffin lids' are of ?

Harrison's 16th Ed. 1710

- A. Calcium
- B. Uric acid
- C. Cystine
- D. Struvite

794 Which of the following stone is radiolucent ?

Harrison's 17th Ed. 1816

- A. Calcium
- B. Cystine
- C. Struvite
- D. Uric acid

Calcium, cystine & struvite stones are radiopaque on standard x-rays. Uric acid stones are radiolucent.

795 Nephrocalcinosis best relates to ?

Harrison's 17th Ed. 1816

- A. Multiple cortical calcifications

- B. Multiple medullary calcifications
- C. Multiple papillary calcifications
- D. Any of the above

Multiple papillary calcifications are called nephrocalcinosis.

796 Infection due to bacteria that possess enzyme urease can cause stones composed of ?

Harrison's 17th Ed. 1817

- A. Calcium
- B. Cystine
- C. Struvite
- D. Uric acid

Infection due to bacteria that possess the enzyme urease can cause stones composed of struvite

797 Radiopacity of Cystine stones is due to ?

Harrison's 16th Ed. 1710

- A. Sulfur content
- B. Calcium content
- C. Zinc content
- D. Magnesium content

798 Urine may appear 'milky' due to which of the following ?

Harrison's 16th Ed. 1711

- A. Uric acid crystals
- B. Cystine crystals
- C. Calcium oxalate crystals
- D. Calcium phosphate crystals

Chapter 288. Urinary Tract Infections, Pyelonephritis, and Prostatitis

799 Which of the following is not included in "Acute infections of upper urinary tract" ?

Harrison's 17th Ed. 1820

- A. Cystitis
- B. Pyelonephritis
- C. Prostatitis
- D. Perinephric abscess

Acute urinary tract infections are either lower tract (urethritis & cystitis) or upper tract (acute pyelonephritis, prostatitis & intrarenal & perinephric abscesses) infection.

800 How many colony counts per mL grown from a properly collected midstream "clean-catch" urine sample indicates infection ?

Harrison's 17th Ed. 1820

- A. $> 10^2$
- B. $> 10^3$
- C. $> 10^4$
- D. $> 10^5$

In UTI, a growth of $\geq 10^5$ organisms per milliliter from a properly collected midstream "clean-catch" urine sample indicates infection. In urine specimens obtained with indwelling catheter, colony counts of 10^2 – 10^4 /mL indicates infection.

801 "Same-strain" recurrent infection evident within 2 weeks of cessation of therapy is due to ?

Harrison's 16th Ed. 1715

- A. Unresolved renal or prostatic infection
- B. Persistent vaginal infection
- C. Persistent intestinal infection
- D. All of the above

"Same-strain" recurrent infections appearing within 2 weeks of cessation of therapy can be due to unresolved renal or prostatic infection (relapse) or of persistent vaginal or intestinal colonization.

802 Symptom related to acute urethral syndrome is ?

Harrison's 17th Ed. 1820

- A. Dysuria
- B. Urgency
- C. Frequency
- D. All of the above

803 Which of the following is true for 'acute urethral syndrome' ?

Harrison's 17th Ed. 1820

- A. Insignificant bacteriuria
- B. Dysuria
- C. Urgency
- D. All of the above

Symptoms of dysuria, urgency and frequency unaccompanied by significant bacteriuria is termed acute urethral syndrome.

804 Vaginal introitus & distal urethra are normally colonized by all except ?

Harrison's 17th Ed. 1821

- A. Streptococcal species
- B. Lactobacilli
- C. Staphylococcal species
- D. Escherichia coli

Vaginal introitus & distal urethra are normally colonized by diphtheroids, streptococcal species, lactobacilli & staphylococcal species but not by enteric gram-negative bacilli that commonly cause UTIs.

805 Which of the following contributes to the 'antibacterial properties of urine' ?

Harrison's 17th Ed. 1821

- A. Prostatic secretion
- B. High urine urea concentration
- C. High urine osmolarity
- D. All of the above

High urea concentration & high osmolarity, prostatic secretions, cytokines & chemokines from bladder epithelial cells provide antibacterial properties to urine.

806 Predisposition to upper urinary tract infection during pregnancy is due to ?

Harrison's 17th Ed. 1821

- A. Decreased ureteral tone
- B. Decreased ureteral peristalsis
- C. Temporary incompetence of vesicoureteral valves
- D. All of the above

During pregnancy, upper UTI is due to decreased ureteral tone, decreased ureteral peristalsis, and temporary incompetence of vesicoureteral valves.

807 E. coli strains causing symptomatic UTIs in noncatheterized patients belong which of the following serogroups ?

Harrison's 17th Ed. 1822

- A. O
- B. K
- C. H
- D. Any of the above

Most E. coli strains that cause symptomatic UTIs in noncatheterized patients belong to a small number of specific O, K, and H serogroups.

808 Which of the following property of uropathogenic E.coli facilitates its infectivity ?

Harrison's 17th Ed. 1822

- A. Fimbriae
- B. Production of hemolysin
- C. Production of aerobactin
- D. All of the above

Besides fimbriae, uropathogenic E. coli strains produce cytotoxins, hemolysin and aerobactin and are resistant to the bactericidal action of human serum.

809 Which of the following is pathognomonic for 'Acute Pyelonephritis' ?

Harrison's 17th Ed. 1822

- A. Renal angle tenderness
- B. Leukocyte casts in urine
- C. Hematuria
- D. All of the above

In the urine of acute pyelonephritis patients, leukocyte casts are pathognomonic.

810 Pyuria in the absence of bacteriuria (sterile pyuria) indicates infection with ?

Harrison's 17th Ed. 1823

- A. C. trachomatis
- B. U. urealyticum
- C. Mycobacterium tuberculosis
- D. All of the above

Pyuria in the absence of bacteriuria (sterile pyuria) may indicate infection with C. trachomatis, U. urealyticum, Mycobacterium tuberculosis or fungi.

811 "Sterile pyuria" may be demonstrated in ?

Harrison's 17th Ed. 1822

- A. Nephrocalcinosis
- B. Vesicoureteral reflux
- C. Interstitial nephritis
- D. All of the above

Sterile pyuria may be seen in calculi, anatomic abnormality, nephrocalcinosis, vesicoureteral reflux, interstitial nephritis or polycystic disease.

812 Leukocyte esterase "dipstick" test is done for ?

Harrison's 17th Ed. 1822

- A. Bacteriuria
- B. Pyuria
- C. Hematuria
- D. All of the above

Leukocyte esterase "dipstick" method is useful in identifying pyuria.

813 **Acute cystitis in pregnancy can be treated with ?**

Harrison's 17th Ed. 1825

- A. Amoxicillin
- B. Nitrofurantoin
- C. Cephalosporin
- D. All of the above

In pregnancy, acute cystitis can be managed with 7 days of treatment with amoxicillin, nitrofurantoin, or a cephalosporin.

814 **Patients of UTI susceptible to papillary necrosis include ?**

Harrison's 16th Ed. 1720

- A. Diabetes mellitus
- B. Sickle cell disease
- C. Chronic alcoholism

- D. All of the above

Patients with diabetes, sickle cell disease, chronic alcoholism, and vascular disease are peculiarly susceptible to papillary necrosis.

815 **Emphysematous pyelonephritis is most often due to ?**

Harrison's 16th Ed. 1720

- A. E. coli
- B. Proteus
- C. Klebsiella
- D. Pseudomonas

Emphysematous pyelonephritis almost always occur in diabetics. It is character-ized by high fever, leukocytosis, renal parenchymal necrosis and accumulation of fermentative gases in kidney & perinephric tissues. E. coli causes most cases.

[illegible]

ANSWERS NEPHROLOGY

1 D	36 D	71 B	106 D	141 D	176 D
2 D	37 C	72 B	107 C	142 D	177 A
3 A	38 D	73 A	108 B	143 D	178 B
4 A	39 D	74 C	109 A	144 B	179 D
5 B	40 D	75 B	110 D	145 C	180 C
6 D	41 A	76 C	111 D	146 D	181 C
7 D	42 C	77 A	112 C	147 D	182 C
8 A	43 B	78 B	113 B	148 B	183 D
9 A	44 A	79 D	114 D	149 D	184 D
10 D	45 B	80 B	115 A	150 D	185 A
11 C	46 B	81 D	116 D	151 D	186 D
12 B	47 D	82 B	117 D	152 D	187 C
13 C	48 D	83 D	118 B	153 D	188 C
14 D	49 D	84 A	119 C	154 C	189 D
15 D	50 A	85 A	120 A	155 D	190 D
16 D	51 B	86 A	121 C	156 D	191 D
17 C	52 C	87 A	122 C	157 D	192 A
18 C	53 B	88 D	123 C	158 D	193 B
19 C	54 C	89 C	124 B	159 A	194 C
20 D	55 A	90 D	125 A	160 A	195 A
21 A	56 D	91 D	126 D	161 A	196 D
22 A	57 A	92 C	127 D	162 B	197 D
23 A	58 A	93 D	128 D	163 A	198 D
24 D	59 C	94 D	129 D	164 B	199 B
25 D	60 D	95 D	130 A	165 D	200 D
26 B	61 A	96 D	131 C	166 D	201 D
27 C	62 D	97 D	132 B	167 D	202 C
28 D	63 B	98 B	133 B	168 D	203 D
29 D	64 D	99 A	134 B	169 C	204 D
30 C	65 A	100 B	135 B	170 D	205 D
31 D	66 C	101 C	136 C	171 D	206 D
32 D	67 B	102 C	137 D	172 B	207 A
33 D	68 B	103 C	138 B	173 A	208 D
34 A	69 C	104 D	139 D	174 D	209 C
35 A	70 D	105 C	140 B	175 D	210 C

ANSWERS NEPHROLOGY

211 D	246 D	281 B	316 B	351 A	386 A
212 B	247 C	282 B	317 B	352 B	387 B
213 C	248 D	283 B	318 B	353 B	388 D
214 D	249 D	284 D	319 A	354 B	389 D
215 A	250 A	285 A	320 B	355 D	390 D
216 D	251 C	286 C	321 C	356 C	391 C
217 D	252 D	287 D	322 B	357 B	392 D
218 A	253 D	288 D	323 A	358 D	393 D
219 D	254 D	289 A	324 C	359 B	394 C
220 C	255 A	290 A	325 B	360 A	395 D
221 D	256 C	291 D	326 C	361 C	396 D
222 B	257 D	292 C	327 B	362 D	397 B
223 D	258 C	293 C	328 D	363 A	398 D
224 C	259 B	294 D	329 D	364 B	399 D
225 A	260 A	295 D	330 B	365 A	400 B
226 D	261 A	296 D	331 A	366 B	401 D
227 D	262 D	297 D	332 A	367 B	402 D
228 D	263 D	298 D	333 D	368 A	403 D
229 A	264 D	299 B	334 A	369 A	404 D
230 B	265 A	300 D	335 B	370 D	405 A
231 D	266 C	301 C	336 B	371 A	406 D
232 C	267 C	302 D	337 C	372 D	407 D
233 C	268 D	303 A	338 A	373 D	408 C
234 C	269 D	304 D	339 A	374 C	409 C
235 A	270 A	305 B	340 B	375 B	410 D
236 D	271 D	306 A	341 A	376 D	411 D
237 D	272 C	307 A	342 C	377 D	412 B
238 C	273 A	308 D	343 D	378 C	413 D
239 C	274 B	309 A	344 D	379 A	414 D
240 A	275 A	310 C	345 C	380 C	415 D
241 D	276 A	311 A	346 C	381 A	416 D
242 A	277 D	312 D	347 D	382 D	417 B
243 C	278 C	313 C	348 D	383 A	418 B
244 C	279 D	314 D	349 B	384 A	419 D
245 A	280 C	315 C	350 B	385 D	420 A

ANSWERS NEPHROLOGY

421 B	456 A	491 D	526 C	561 D	596 C
422 D	457 C	492 D	527 B	562 D	597 B
423 D	458 A	493 D	528 D	563 A	598 D
424 D	459 A	494 D	529 A	564 B	599 D
425 D	460 B	495 D	530 D	565 D	600 D
426 D	461 B	496 D	531 D	566 D	601 D
427 D	462 A	497 D	532 D	567 D	602 C
428 C	463 D	498 D	533 D	568 D	603 D
429 D	464 B	499 D	534 D	569 D	604 A
430 D	465 B	500 B	535 C	570 A	605 B
431 C	466 D	501 D	536 D	571 D	606 D
432 C	467 D	502 D	537 D	572 D	607 D
433 D	468 A	503 D	538 C	573 D	608 A
434 D	469 C	504 D	539 D	574 A	609 A
435 D	470 C	505 B	540 D	575 B	610 B
436 D	471 B	506 D	541 B	576 D	611 D
437 D	472 B	507 D	542 B	577 C	612 A
438 D	473 C	508 D	543 B	578 B	613 B
439 D	474 D	509 D	544 D	579 C	614 A
440 D	475 D	510 D	545 B	580 B	615 A
441 A	476 C	511 B	546 B	581 A	616 C
442 A	477 D	512 D	547 D	582 D	617 C
443 D	478 D	513 C	548 D	583 D	618 C
444 D	479 C	514 D	549 B	584 D	619 D
445 D	480 A	515 D	550 C	585 A	620 D
446 C	481 A	516 D	551 A	586 D	621 D
447 C	482 A	517 D	552 B	587 C	622 C
448 D	483 D	518 B	553 C	588 C	623 A
449 A	484 D	519 B	554 D	589 D	624 C
450 A	485 A	520 D	555 C	590 A	625 D
451 B	486 A	521 A	556 B	591 B	626 D
452 D	487 D	522 D	557 B	592 C	627 B
453 C	488 D	523 D	558 A	593 C	628 D
454 B	489 D	524 D	559 D	594 D	629 D
455 D	490 D	525 A	560 D	595 D	630 A

ANSWERS NEPHROLOGY

631 B	666 D	701 D	736 C	771 C	806 D
632 A	667 C	702 C	737 D	772 B	807 D
633 A	668 C	703 D	738 D	773 B	808 D
634 B	669 A	704 B	739 B	774 A	809 B
635 A	670 B	705 A	740 D	775 D	810 D
636 C	671 D	706 A	741 C	776 D	811 D
637 B	672 C	707 D	742 A	777 B	812 B
638 B	673 A	708 D	743 D	778 D	813 D
639 D	674 C	709 A	744 C	779 B	814 D
640 D	675 D	710 D	745 A	780 A	815 A
641 D	676 D	711 B	746 B	781 A	
642 D	677 C	712 D	747 C	782 D	
643 C	678 A	713 D	748 D	783 D	
644 B	679 C	714 D	749 D	784 D	
645 C	680 D	715 B	750 D	785 D	
646 D	681 D	716 B	751 D	786 D	
647 B	682 D	717 A	752 C	787 D	
648 D	683 A	718 D	753 D	788 C	
649 D	684 A	719 D	754 D	789 A	
650 D	685 D	720 D	755 D	790 D	
651 C	686 D	721 A	756 A	791 A	
652 B	687 D	722 D	757 C	792 A	
653 A	688 A	723 C	758 A	793 D	
654 D	689 C	724 C	759 D	794 D	
655 A	690 C	725 D	760 B	795 C	
656 D	691 D	726 C	761 B	796 C	
657 A	692 B	727 D	762 D	797 A	
658 C	693 B	728 B	763 B	798 D	
659 B	694 A	729 B	764 D	799 A	
660 D	695 B	730 D	765 D	800 D	
661 C	696 D	731 D	766 A	801 D	
662 A	697 D	732 C	767 B	802 D	
663 B	698 D	733 A	768 C	803 D	
664 D	699 D	734 D	769 C	804 D	
665 C	700 D	735 A	770 D	805 D	

292 - Diseases of the Esophagus

- 1 **Dysphagia is defined as a sensation of "sticking" or obstruction of the passage of food through ?**

Harrison's 17th Ed. 237

- A. Mouth
- B. Pharynx
- C. Esophagus
- D. All of the above

Dysphagia is defined as a sensation of "sticking" or obstruction of the passage of food through the mouth, pharynx or esophagus.

- 2 **Foreign body sensation localized in the neck is termed as ?**

Harrison's 18th Ed. 297

- A. Odynophagia
- B. Globus pharyngeus
- C. Transfer dysphagia
- D. Phagophobia

A foreign body sensation localized in the neck that does not interfere with swallowing & is sometimes relieved by swallowing is termed as "Globus pharyngeus".

- 3 **Which of the following is characteristic of oropharyngeal dysphagia ?**

Harrison's 18th Ed. 297

- A. Odynophagia
- B. Globus pharyngeus
- C. Transfer dysphagia
- D. Phagophobia

Transfer dysphagia frequently results in nasal regurgitation & pulmonary aspiration during swallowing and is characteristic of oropharyngeal dysphagia.

- 4 **Which of the following may have a psychogenic cause of dysphagia ?**

Harrison's 18th Ed. 297

- A. Globus pharyngeus
- B. Transfer dysphagia
- C. Phagophobia
- D. All of the above

Phagophobia refers to fear of swallowing. Refusal to swallow thereby may be psychogenic.

- 5 **"Deglutitive inhibition" best relates to which of the following ?**

Harrison's 18th Ed. 297

- A. Smell
- B. Mastication
- C. Peristaltic contraction of esophagus
- D. Gastroesophageal reflux

Primary peristalsis refers to peristaltic contractions elicited in response to a swallow. It is an interplay of sequenced inhibition followed by contraction of the entire length of esophageal musculature. The inhibition that precedes peristaltic contraction is called deglutitive inhibition.

- 6 **Deglutitive inhibition refers to ?**

Harrison's 18th Ed. 297

- A. Complete esophageal obstruction
- B. Difficulty in initiating a swallow
- C. Inhibition that precedes peristaltic contraction

- D. Misdirection of food

Inhibition that precedes the peristaltic contraction is called deglutitive inhibition.

- 7 **Peristalsis that begins at the point of oesophageal distention and proceeds distally is called ?**

Harrison's 18th Ed. 297

- A. Primary peristalsis
- B. Secondary peristalsis
- C. Tertiary peristalsis
- D. Any of the above

Local distention of esophagus activates secondary peristalsis. It begins at the point of distention and proceeds distally as in gastroesophageal reflux.

- 8 **Which of the following oesophageal contractions is nonperistaltic ?**

Harrison's 18th Ed. 297

- A. Primary peristalsis
- B. Secondary peristalsis
- C. Tertiary peristalsis
- D. Any of the above

Tertiary esophageal contractions are nonperistaltic, disordered esophageal contractions that occur spontaneously during fluoroscopic observation.

- 9 **Which of the following is a part of upper esophageal sphincter (UES) physiologically ?**

Harrison's 18th Ed. 298

- A. Cricopharyngeus muscle
- B. Inferior pharyngeal constrictor
- C. Proximal portion of cervical esophagus
- D. All of the above

Physiologically, UES consists of the cricopharyngeus muscle, the adjacent inferior pharyngeal constrictor, and the proximal portion of the cervical esophagus.

- 10 **Innervation to the musculature acting on UES to facilitate its opening during swallowing comes from ?**

Harrison's 18th Ed. 298

- A. Fifth cranial nerve
- B. Seventh cranial nerve
- C. Twelfth cranial nerve
- D. All of the above

UES innervation is derived from the vagus nerve, whereas innervation to the musculature acting on UES to facilitate its opening during swallowing comes from fifth, seventh & twelfth cranial nerves.

- 11 **Which of the following is involved in keeping UES closed at rest ?**

Harrison's 18th Ed. 298

- A. Cricopharyngeus muscle
- B. Inferior pharyngeal constrictor
- C. Proximal portion of cervical esophagus
- D. All of the above

UES remains closed at rest due to its inherent elastic properties and neurogenically mediated contraction of cricopharyngeus muscle.

- 12 **Which of the following is a muscle of upper esophageal sphincter (UES) ?**

Harrison's 17th Ed. 237

- A. Cricopharyngeus muscle

- B. Inferior pharyngeal constrictor muscles
- C. Geniohyoid muscle
- D. All of the above

UES consists of constrictor (cricopharyngeus and inferior pharyngeal constrictor muscles) and dilator muscles (suprahyoid muscles including geniohyoid).

13 Which of the following muscle is involved in opening UES during swallowing ?

Harrison's 18th Ed. 298

- A. Geniohyoid
- B. Mylohyoid
- C. Stylohyoid
- D. Styloglossus

UES opening during swallowing is due to relaxation of cricopharyngeus muscle (cessation of vagal excitation) and simultaneous contraction of suprahyoid & geniohyoid muscles.

14 Motor dysphagia refers to ?

Harrison's 18th Ed. 298

- A. Weakness of peristaltic contractions
- B. Impaired deglutitive inhibition
- C. Impaired sphincter relaxation
- D. All of the above

Dysphagia caused by a large bolus or a narrow lumen is called structural dysphagia. Dysphagia due to weakness of peristaltic contractions or to impaired deglutitive inhibition causing nonperistaltic contractions & impaired sphincter relaxation is called propulsive or motor dysphagia.

15 Length of adult esophagus is ?

Harrison's 18th Ed. 298

- A. 12 - 16 cm
- B. 14 - 20 cm
- C. 16 - 24 cm
- D. 18 - 26 cm

Adult esophagus is 18 - 26 cm in length. Anatomically, it is divided into cervical esophagus (from pharygoesophageal junction to suprasternal notch) and thoracic esophagus (upto the diaphragmatic hiatus).

16 In an adult, esophageal lumen can distend up to ?

Harrison's 17th Ed. 238

- A. 4 cm in diameter
- B. 6 cm in diameter
- C. 8 cm in diameter
- D. 10 cm in diameter

In adult, esophageal lumen can distend up to 4 cm in diameter. When esophagus cannot dilate beyond 2.5 cm in diameter, dysphagia to normal solid food occurs. Dysphagia is always present when esophagus cannot distend beyond 1.3 cm.

17 Hallmark of oropharyngeal dysphagia is ?

Harrison's 18th Ed. 299

- A. Food impaction
- B. Odynophagia
- C. Nasal regurgitation
- D. Hoarseness

Nasal regurgitation & tracheobronchial aspiration with swallowing are hallmarks of oropharyngeal dysphagia or a tracheoesophageal fistula.

18 Which of the following skin diseases may involve the oesophagus ?

Harrison's 18th Ed. 300

- A. Scleroderma

- B. Pemphigoid
- C. Epidermolysis bullosa
- D. All of the above

Scleroderma, pemphigoid and epidermolysis bullosa can involve the esophagus.

19 Gastric distention-evoked transient lower esophageal sphincter relaxation (tLESR) is a ?

Harrison's 17th Ed. 1847

- A. Stretch reflex
- B. Chemical reflex
- C. Vasovagal reflex
- D. All of the above

Gastric distention - evoked transient lower esophageal sphincter relaxation (tLESR) is a vagovagal reflex.

20 Agents that increase LES pressure are all except ?

Harrison's 17th Ed. 1847

- A. Substance P
- B. Prostaglandin $F_{2\alpha}$
- C. Secretin
- D. Gastrin

21 Agents that reduce LES pressure are all except ?

Harrison's 17th Ed. 1847

- A. Cholecystokinin
- B. Secretin
- C. Dopamine
- D. Gastrin

22 Agents that reduce LES pressure are all except ?

Harrison's 17th Ed. 1847

- A. VIP
- B. Calcitonin gene-related peptide (CGRP)
- C. Prostaglandin E
- D. Prostaglandin $F_{2\alpha}$

23 Agents that reduce LES pressure are all except ?

Harrison's 17th Ed. 1847

- A. Adenosine
- B. Dopamine
- C. Substance P
- D. Nitrates

Reduction in LES sphincter pressure occurs with phosphodiesterase-5 inhibitors (sildenafil) use, fatty meals, smoking, and beverages with high xanthine content (tea, coffee, cola), nicotine, beta-adrenergic agonists, dopamine, cholecystokinin, secretin, vasoactive intestinal peptide (VIP), calcitonin gene-related peptide, adenosine, prostaglandin E, nitric oxide donors (nitrates). LES contraction occurs with GABA-B agonists (baclofen), muscarinic M_2 and M_3 receptor agonists, alpha-adrenergic agonists, gastrin, substance P & $Pg F_{2\alpha}$.

24 Which of the following statements about upper esophageal sphincter (UES) is false ?

Harrison's 16th Ed. 1739

- A. Formed by cricopharyngeus & inferior pharyngeal constrictor muscles
- B. These muscles exhibit myogenic tone
- C. These muscles receive no inhibitory innervation
- D. Opened by central inhibition of sphincter muscles

25 Which of the following statements about lower esophageal sphincter (LES) is false ?

Harrison's 16th Ed. 1739

- A. Innervated by parallel sets of parasympathetic excitatory & inhibitory pathways
- B. Opens in response to activity of inhibitory nerves
- C. Neurotransmitters of excitatory nerves are acetylcholine, substance P & nitric oxide
- D. Neurotransmitters of inhibitory nerves is VIP

26 The most common esophageal symptom is ?

Harrison's 18th Ed. 2427

- A. Heartburn
- B. Regurgitation
- C. Water brash
- D. Globus sensation

Heartburn is the most common esophageal symptom. It is characterized by a discomfort or burning sensation behind sternum arising from epigastrium and may radiate toward the neck.

27 Pyrosis is best related to ?

Harrison's 18th Ed. 2427

- A. Fever
- B. Heartburn
- C. Defervescence
- D. Pain

Heartburn, or pyrosis, is characterized by burning retrosternal discomfort.

28 Most frequent esophageal cause of chest pain is ?

Harrison's 18th Ed. 2427

- A. Gastroesophageal reflux
- B. Diffuse esophageal spasm (DES)
- C. Achalasia
- D. Esophageal hypersensitivity syndrome

Gastroesophageal reflux is the most common cause of esophageal chest pain.

29 Odynophagia is unusual in ?

Harrison's 18th Ed. 2427

- A. Pill-induced esophagitis
- B. Nonreflux esophagitis
- C. Esophageal perforation
- D. Uncomplicated reflux esophagitis

Odynophagia (painful swallowing) is characteristic of nonreflux esophagitis, herpes & pill-induced esophagitis. Odynophagia may occur with peptic ulcer of esophagus (Barrett's ulcer), carcinoma with periesophageal involvement, caustic damage of esophagus, and esophageal perforation. Odynophagia is unusual in uncomplicated reflux esophagitis.

30 Reflex salivary hypersecretion in response to acidification of the esophageal mucosa is called ?

Harrison's 18th Ed. 2427

- A. Water brash
- B. Salivary brash
- C. Esophageal brash
- D. Barret's brash

Water brash is excessive reflex salivation resulting from a vagal reflex triggered by acidification of the esophageal mucosa. It is not regurgitation which is effortless appearance of gastric or esophageal contents in the mouth.

31 Esophageal peristalsis is best studied in ?

Harrison's 17th Ed. 1848

- A. Upright position
- B. Recumbent position
- C. Lateral position
- D. Head down position

Esophageal peristalsis is best studied in the recumbent position, because in the upright position barium passage occurs largely by gravity alone.

32 Motility pattern of esophagus showing reduced amplitude of contractions in lower esophagus, peristaltic or simultaneous in onset with hypotension of LES is suggestive of ?

Harrison's 17th Ed. 1849 Figure 286-3

- A. Scleroderma
- B. Achalasia
- C. Diffuse esophageal spasm
- D. None of the above

In scleroderma, thoracic esophagus shows reduced amplitude of contractions, which may be peristaltic or simultaneous in onset & hypotension of LES.

33 Motility pattern of esophagus showing reduced amplitude of contractions in lower esophagus, simultaneous in onset with hypertensive LES nonrelaxing on swallowing is suggestive of ?

Harrison's 17th Ed. 1849 Figure 286-3

- A. Scleroderma
- B. Achalasia
- C. Diffuse esophageal spasm
- D. None of the above

In achalasia, lower part of esophagus shows contractions that are reduced in amplitude & simultaneous in onset. In contrast to scleroderma, LES in achalasia is hypertensive and fails to relax in response to a swallow.

34 Motility pattern of esophagus showing large amplitude, prolonged and repetitive contractions in lower esophagus, simultaneous in onset is suggestive of ?

Harrison's 17th Ed. 1849 Figure 286-3

- A. Scleroderma
- B. Achalasia
- C. Diffuse esophageal spasm
- D. None of the above

In diffuse esophageal spasm, lower part of esophagus shows simultaneous-onset, large-amplitude, prolonged, repetitive contractions.

35 Esophageal motility studies are helpful in the diagnosis of all except ?

Harrison's 17th Ed. 1849

- A. Achalasia
- B. Diffuse esophageal spasm
- C. Scleroderma
- D. Mechanical dysphagia

Esophageal motility studies are helpful in the diagnosis of esophageal motor disorders (achalasia, spasm, and scleroderma) but are of little value in the differential diagnosis of mechanical dysphagia.

36 Which is the most common type of hiatal hernia ?

Harrison's 18th Ed. 2428

- A. Type I
- B. Type II

- C. Type III
- D. Type IV

Type I or sliding hiatal hernia comprising ~95% of hiatus hernias.

37 When colon herniate into the mediastinum, the type of hiatus hernia is ?

Harrison's 18th Ed. 2428

- A. Type I
- B. Type II
- C. Type III
- D. Type IV

With type IV hiatal hernias, viscera other than stomach herniate into mediastinum, most commonly the colon.

38 Intersection of squamous epithelium of tubular oesophagus & columnar epithelium of stomach is termed ?

Lancet 2009; 373:850 - 61

- A. W line
- B. X line
- C. Y line
- D. Z line

The intersection of squamous epithelium of the tubular oesophagus & columnar epithelium of stomach is termed Z line, because of jagged appearance of the interface.

39 A lower esophageal mucosal ring is also called ?

Harrison's 18th Ed. 2429

- A. A ring
- B. B ring
- C. C ring
- D. D ring

A lower esophageal mucosal ring, also called B ring, is a thin membranous narrowing at the squamocolumnar mucosal junction.

40 Location of 'Schatzki ring' is ?

Harrison's 18th Ed. 2429

- A. Hypopharyngeal
- B. Mid esophageal
- C. Lower esophageal
- D. Any of the above

Schatzki ring is a lower esophageal mucosal ring. It is a thin, weblike constriction located at the squamo-columnar mucosal junction at or near the border of the LES. It may result from GERD or be congenital in origin.

41 Schatzki ring invariably produces dysphagia when the lumen diameter is ?

Harrison's 18th Ed. 2429

- A. < 1.3 cm
- B. < 2.3 cm
- C. < 3.3 cm
- D. < 4.3 cm

Schatzki ring invariably produces dysphagia when the lumen diameter is <1.3 cm.

42 "Steakhouse syndrome" best relates to ?

Harrison's 18th Ed. 2429

- A. Mouth
- B. Oesophagus

- C. Stomach
- D. Colon

Schatzki ring is one of the most common causes of intermittent food impaction, also called "steakhouse syndrome" as meat is a typical instigator.

43 Which of the following is false about Plummer-Vinson syndrome ?

Harrison's 18th Ed. 2429

- A. Young women
- B. Symptomatic proximal esophageal web
- C. Iron-deficiency anemia
- D. All of the above

Symptomatic hypopharyngeal webs and iron-deficiency anemia in middle-aged women constitutes Plummer-Vinson syndrome.

44 Which of the following is false about Zenker's diverticula ?

Harrison's 18th Ed. 2429

- A. Hypopharyngeal
- B. False diverticula
- C. Associated with distal obstruction
- D. None of the above

45 Which of the following is false about Zenker's diverticulum ?

Harrison's 18th Ed. 2429

- A. Occurs below the Killian's triangle
- B. Causes halitosis & regurgitation of saliva & food
- C. Nasogastric intubation may cause perforation
- D. Symptomatic pt's treated by cricopharyngeal myotomy

Zenker's diverticulum appears in natural zone of weakness in posterior hypopharyngeal wall (Killian's triangle).

46 Esophageal inlet patch best relates to ?

Harrison's 18th Ed. 2430

- A. Esophageal atresia
- B. Benign esophageal tumor
- C. Heterotopic gastric mucosa
- D. Zenker's diverticula

Heterotopic gastric mucosa, also known as an esophageal inlet patch, is an area of gastric type epithelium in proximal cervical esophagus. The inlet patch is due to incomplete replacement of embryonic columnar epithelium with squamous epithelium.

47 Which of the following statements about achalasia is false ?

Harrison's 18th Ed. 2430-31

- A. Motor disorder of esophageal smooth muscle
- B. UES & LES relax normally with swallowing
- C. Nonperistaltic contractions in esophageal body
- D. Underlying abnormality is loss of intramural neurons

With a swallow, pressure in sphincters falls and a contraction wave starts in pharynx and progresses down the esophagus. In achalasia, esophageal body loses peristaltic contractions & are replaced by simultaneous contractions with elevated resting pressure & LES does not relax normally in response to swallowing. Prominent degeneration of nerve cell bodies seen in achalasia.

48 Which of the following statements about achalasia is false ?

Harrison's 18th Ed. 2430-31

- A. Underlying abnormality is loss of intramural neurons
- B. Inhibitory neurons containing substance P are predominantly involved
- C. Inhibitory neurons containing VIP are involved

- D. Presence of GE reflux goes against achalasia

Inhibitory neurons containing VIP and nitric oxide synthase are predominantly involved.

49 Which of the following is not a feature of achalasia ?

Harrison's 18th Ed. 2430-31

- A Dysphagia
- B Gastroesophageal reflux
- C Chest pain
- D Regurgitation

Dysphagia, chest pain, regurgitation and weight loss are the main symptoms of achalasia. Presence of gastroesophageal reflux goes against achalasia.

50 Chest x-ray in achalasia may show all except ?

Harrison's 17th Ed. 1850

- A Absence of the gastric air bubble
- B Tubular mediastinal mass beside the aorta
- C Air-fluid level in mediastinum in upright position
- D Atelectasis

A chest x-ray shows absence of the gastric air bubble and sometimes a tubular mediastinal mass beside the aorta. An air-fluid level in the mediastinum in the upright position represents retained food in the esophagus. Barium swallow shows esophageal dilation, and in advanced cases the esophagus may become sigmoid. On fluoroscopy with barium swallow, normal peristalsis is lost in the lower two-thirds of the esophagus. The terminal part of the esophagus shows a persistent beaklike narrowing representing the nonrelaxing LES.

51 In CCK test, paradoxical contraction of LES is found in ?

Harrison's 17th Ed. 1850

- A Achalasia
- B Gastric carcinoma
- C Scleroderma
- D Diffuse esophageal spasm

In achalasia, Cholecystokinin (CCK) paradoxically causes contraction of LES (CCK test) because neurally transmitted inhibitory effect of CCK is absent & direct excitatory effect of CCK remains unopposed.

52 In achalasia, which is the treatment of choice ?

Harrison's 18th Ed. 2432

- A Pneumatic dilatation
- B Esophageal resection with gastric pull-up
- C Laparoscopic Heller myotomy of LES
- D Open surgical myotomy of LES

Laparoscopic Heller myotomy is currently the procedure of choice.

53 Secondary achalasia may be caused by all except ?

Harrison's 17th Ed. 1849

- A Ulcerative colitis
- B Chagas' disease
- C Eosinophilic gastroenteritis
- D Neurodegenerative disorders

Secondary achalasia may be caused by gastric carcinoma that infiltrates the esophagus, lymphoma, Chagas' disease, certain viral infections, eosinophilic gastroenteritis & neurodegenerative disorders.

54 Which of the following is not a hypertensive motor disorder of esophagus ?

Harrison's 18th Ed. 2432

- A Diffuse esophageal spasm (DES)
- B Nutcracker esophagus

- C. Hypercontracting LES

- D. Hypertensive LES

The hypertensive disorders of esophagus include nutcracker esophagus, hypercontracting LES and hypertensive LES. DES is characterized by nonperistaltic contractions.

55 Esophageal contractions are normally peristaltic but hypertensive in ?

Harrison's 18th Ed. 2432

- A Nutcracker esophagus
- B Hypercontracting LES
- C Hypertensive LES
- D All of the above

In nutcracker esophagus, esophageal contractions are normally peristaltic but hypertensive. In hypercontracting LES, normal sphincter relaxation is followed by hypertensive contraction. In hypertensive LES, basal LES pressure is elevated, but sphincter relaxation and contraction are normal.

56 "Corkscrew" esophagus is typical of ?

Harrison's 18th Ed. 2432

- A Diffuse esophageal spasm (DES)
- B Achalasia
- C Carcinoma esophagus
- D GERD

Barium swallow in DES shows curling or multiple ripples in the wall, sacculations, and pseudodiverticula - termed "corkscrew" esophagus.

57 Which of the following contributes to the development of gastroesophageal reflux disease (GERD) ?

Harrison's 18th Ed. 2433

- A Transient LES relaxations
- B LES hypotension
- C Anatomic distortion of esophagogastric junction
- D All of the above

58 Which of the following may have a protective effect in GERD patients ?

Harrison's 18th Ed. 2433

- A Zollinger-Ellison syndrome
- B Chronic H. pylori gastritis
- C Hiatus hernia
- D Scleroderma

Chronic H. pylori gastritis may have a protective effect in GERD by inducing atrophic gastritis with concomitant hypoacidity.

59 Which out of the following conditions has associations with GERD ?

Harrison's 18th Ed. 2434

- A Pulmonary fibrosis
- B Chronic sinusitis
- C Cardiac arrhythmias
- D All of the above

Extraesophageal syndromes that have established association to GERD include chronic cough, laryngitis, asthma & dental erosions. Other conditions like pharyngitis, chronic bronchitis, pulmonary fibrosis, chronic sinusitis, cardiac arrhythmias, sleep apnea, and recurrent aspiration pneumonia have proposed associations with GERD.

60 Multiple esophageal mucosal rings are characteristic of ?

Harrison's 18th Ed. 2434

- A Eosinophilic esophagitis

- B. Radiation esophagitis
- C. Corrosive esophagitis
- D. Candida Esophagitis

Multiple mucosal rings (feline esophagus) are characteristic of eosinophilic esophagitis.

61 Risk of development of esophageal adenocarcinoma in Barrett's metaplasia is increased by ?

Harrison's 18th Ed. 2434

- A. 5 fold
- B. 10 fold
- C. 15 fold
- D. 20 fold

Risk of development of esophageal adenocarcinoma in Barrett's metaplasia is increased by 20 fold.

62 Esophageal mucosal biopsies should be taken at least ?

Harrison's 17th Ed. 1851

- A. 2 cm above the LES
- B. 5 cm above the LES
- C. 7 cm above the LES
- D. 9 cm above the LES

Mucosal biopsies should be performed at least 5 cm above LES, as esophageal mucosal changes of chronic esophagitis are frequent in the most distal esophagus in otherwise normal individuals.

63 Which of the following about Bernstein test is false ?

Harrison's 17th Ed. 1851

- A. Infusion of 0.1 N HCl & saline in esophagus
- B. Useful in diagnosing Barrett's esophagus that is not endoscopically obvious
- C. In symptomatic esophagitis, infusion of acid, but not of saline, reproduces symptoms of heartburn
- D. Infusion of acid in normal individuals produces no symptom

Bernstein test involves infusion of solutions of 0.1 N HCl or normal saline in esophagus. In symptomatic esophagitis, infusion of acid, but not of saline, reproduces the symptoms of heartburn. Infusion of acid in normal individuals usually produces no symptoms.

64 Which of the following statements about Barrett's esophagus is false ?

Harrison's 17th Ed. 1852, N Engl J Med 2006;354:1403-9

- A. Barrett's esophagus is an acquired condition
- B. Metaplasia occurs from esophageal columnar to squamous epithelium
- C. Complication of severe reflux esophagitis
- D. Risk factor for esophageal adenocarcinoma

Metaplasia of esophageal squamous epithelium to columnar epithelium (Barrett's esophagus) is a complication of severe reflux esophagitis. Finding intestinal metaplasia with goblet cells in esophagus is diagnostic of Barrett's esophagus.

65 Which of the following groups is at greatest risk of Barrett's metaplasia progressing to adenocarcinoma ?

Harrison's 18th Ed. 2434

- A. Obese black males in fifth decade of life
- B. Obese white males in fifth decade of life
- C. Obese black males in sixth decade of life
- D. Obese white males in sixth decade of life

Barrett's metaplasia can progress to adenocarcinoma and the group at greatest risk is obese white males in their sixth decade of life.

66 Methods for mucosal ablation in Barrett's esophagus include all except ?

N Engl J Med 2006;354:1403-9

- A. Electrocautery
- B. Mucosal stripping
- C. Argon-plasma-beam fulguration
- D. Chemical fulguration

67 Methods for mucosal ablation in Barrett's esophagus include all except ?

N Engl J Med 2006;354:1403-9

- A. Laser photothermal coagulation
- B. Heater-probe ablation
- C. Hyperbaric oxygen ablation
- D. Cryotherapy

68 Photosensitizing agent used in photodynamic therapy for Barrett's esophagus is ?

N Engl J Med 2006;354:1403-9

- A. Trigen sodium
- B. Porfimer sodium
- C. Sugran sodium
- D. Mofetil sodium

69 Which of the following foods is "refluxogenic" ?

Harrison's 18th Ed. 2434

- A. Peppermint
- B. Tomato-based foods
- C. Alcohol
- D. All of the above

Foods that reduce lower esophageal sphincter pressure are called "refluxogenic". These include fatty foods, alcohol, spearmint, peppermint, tomato-based foods, coffee and tea.

70 Absorption of which of the following may be compromised on indefinite treatment with PPIs ?

Harrison's 18th Ed. 2435

- A. Vitamin B12
- B. Calcium
- C. Iron
- D. All of the above

With indefinite treatment with PPIs, Vitamin B12, calcium, and iron absorption may be compromised and susceptibility to enteric infections, particularly Clostridium difficile colitis increased.

71 Characteristic endoscopic finding of Eosinophilic Esophagitis is ?

Harrison's 18th Ed. 2435

- A. Multiple esophageal rings
- B. Linear furrows
- C. Punctate exudates
- D. All of the above

The characteristic endoscopic findings of Eosinophilic Esophagitis (EoE) include multiple esophageal rings, linear furrows, and punctate exudates.

72 For diagnosis of eosinophilic esophagitis, eosinophils in esophageal mucosa per high-power field should be ?

Harrison's 18th Ed. 2436

- A. 5 or more

- B. 10 or more
- C. 15 or more
- D. 20 or more

The diagnosis of eosinophilic esophagitis is made histologically, with 15 or more eosinophils per high-power field in the esophageal mucosa. Normal esophagus contains almost no eosinophils.

73 Preferred treatment of eosinophilic esophagitis is ?

Harrison's 18th Ed. 2436, Harrison's 17th Ed. 1854

- A. H₂ receptor blocking agents
- B. Nifedipine
- C. Swallowed fluticasone propionate
- D. Isosorbide dinitrate

Treatment of eosinophilic esophagitis consists of a 12-week course of swallowed fluticasone propionate using a metered dose inhaler. Anti human interleukin 5, systemic steroids, montelukast or cromolyn may be useful.

74 Odynophagia is a characteristic symptom of ?

Harrison's 18th Ed. 2436

- A. Pill-induced esophagitis
- B. Reflux esophagitis
- C. Esophageal perforation
- D. Infectious esophagitis

Regardless of the infectious agent, odynophagia is a characteristic symptom of infectious esophagitis.

75 Which of the following is characteristic of Candida esophagitis ?

Harrison's 18th Ed. 2436

- A. Bleeding
- B. White plaques with friability
- C. Perforation
- D. Stricture

Candida esophagitis has a characteristic appearance of white plaques with friability. Rarely, Candida esophagitis is complicated by bleeding, perforation, stricture, or systemic invasion.

76 Candida esophagitis can be treated with ?

Harrison's 18th Ed. 2436

- A. Fluconazole
- B. Itraconazole
- C. Amphotericin B
- D. Any of the above

77 "Volcano-like" oesophageal ulcerations are seen in ?

Harrison's 17th Ed. 1852

- A. Candidiasis
- B. HSV
- C. CMV
- D. Corrosive poisoning

In HSV infection of esophagus, endoscopy shows vesicles & small, discrete, punched-out ("volcano-like") superficial ulcerations with or without a fibrinous exudate.

78 Herpes simplex virus (HSV) esophagitis is treated with ?

Harrison's 18th Ed. 2436

- A. Acyclovir
- B. Foscarnet
- C. Famciclovir
- D. All of the above

79 Which of the following infections occur only in immunocompromised patients ?

Harrison's 18th Ed. 2436

- A. Herpes simplex virus (HSV) esophagitis
- B. Varicella-zoster virus (VZV) esophagitis
- C. Cytomegalovirus (CMV) esophagitis
- D. Candida esophagitis

Cytomegalovirus (CMV) infections occur only in immunocompromised patients, particularly transplant recipients.

80 Serpiginous ulcers in an otherwise normal esophageal mucosa is a feature of ?

Harrison's 18th Ed. 2436

- A. Herpes simplex virus (HSV) esophagitis
- B. Varicella-zoster virus (VZV) esophagitis
- C. Cytomegalovirus (CMV) esophagitis
- D. Candida Esophagitis

Endoscopically, CMV lesions appear as serpiginous ulcers in an otherwise normal mucosa, particularly in the distal esophagus.

81 Ganciclovir is the treatment of choice for ?

Harrison's 18th Ed. 2436

- A. Herpes simplex virus (HSV) esophagitis
- B. Varicella-zoster virus (VZV) esophagitis
- C. Cytomegalovirus (CMV) esophagitis
- D. Candida Esophagitis

Ganciclovir, 5 mg/kg BD IV, is the treatment of choice for Cytomegalovirus (CMV) esophagitis.

82 Boerhaave's syndrome refers to ?

Harrison's 18th Ed. 2436

- A. Esophageal damage due to instrumentation
- B. Esophageal damage due to vomiting or retching
- C. Esophageal damage due to external trauma
- D. None of the above

Boerhaave's syndrome or spontaneous rupture refers to esophageal rupture caused by increased intraesophageal pressure associated with forceful vomiting or retching.

83 Instrumental perforation usually occurs in ?

Harrison's 18th Ed. 2436

- A. Upper esophagus
- B. Mid esophagus
- C. Lower esophagus
- D. Any of the above

Instrumental perforation occurs in pharynx or lower esophagus, just above diaphragm in posterolateral wall.

84 Mallory-Weiss Syndrome can be caused by ?

Harrison's 18th Ed. 2436

- A. Vomiting
- B. Retching
- C. Vigorous coughing
- D. All of the above

Vomiting, retching, or vigorous coughing can cause a nontransmural tear at the gastroesophageal junction that is Mallory-Weiss Syndrome.

85 Which of the following is false about Mallory-Weiss Syndrome ?*Harrison's 18th Ed. 2436-7*

- A. Usually involves esophageal mucosa
- B. Upper gastrointestinal bleeding
- C. In most patients bleeding ceases spontaneously
- D. Respond to vasopressin therapy

Mallory-Weiss Syndrome refers to mucosal tear involving gastric mucosa near the squamocolumnar mucosal junction caused by vomiting, retching or vigorous coughing. Upper gastrointestinal bleeding may be severe but in mostly bleeding ceases spontaneously. Respond to vasopressin therapy or angiographic embolization.

86 Treatment with which of the following can reduce esophagitis during radiation treatment ?*Harrison's 17th Ed. 1853*

- A. Cimetidine
- B. Indomethacin
- C. Allopurinol
- D. Sucralfate

indomethacin treatment may reduce radiation damage of esophagus.

87 Patients with alkaline esophagitis are treated with ?*Harrison's 17th Ed. 1852*

- A. Cholestyramine
- B. Aluminum hydroxide
- C. Sucralfate
- D. All of the above

Treatment of alkaline esophagitis includes neutralization of bile salts with cholestyramine, aluminum hydroxide, or sucralfate.

88 Pill-induced esophagitis can be caused by all except ?*Harrison's 18th Ed. 2437*

- A. Alendronate
- B. Ferrous sulfate
- C. Doxycycline
- D. Medroxyprogesterone

Pill-induced esophagitis mostly occurs with ingestion of doxycycline, tetracycline, quinidine, phenytoin, potassium chloride, ferrous sulfate, nonsteroidal anti-inflammatory drugs (NSAIDs), and bisphosphonates.

89 Esophageal lesion in systemic sclerosis consist of ?*Harrison's 18th Ed. 2437*

- A. Atrophy of smooth muscle
- B. Weakness in lower two-thirds of esophagus
- C. Incompetence of LES
- D. All of the above

Esophageal lesions in systemic sclerosis consist of atrophy of smooth muscle, manifested by weakness in lower two-thirds of esophagus & incompetence of LES.

90 "Strawberry gums" is a pathognomonic sign of ?*Harrison's 17th Ed. Chapter 32*

- A. Wegener's granulomatosis
- B. Acute myelomonocytic leukemia
- C. Down's syndrome
- D. Diabetes mellitus

Pathognomonic sign of Wegener's granulomatosis is a red-purplish, granular gingivitis called strawberry gums.

293 - Peptic Ulcer Disease**91 Rumination is best related to ?***Harrison's 18th Ed. 301*

- A. Nausea
- B. Vomiting
- C. Regurgitation
- D. All of the above

Rumination refers to repeated voluntary regurgitation of stomach contents, which may be rechewed and reswallowed.

92 Under normal conditions, frequency of slow wave cycles in the stomach is ?*Harrison's 18th Ed. 301*

- A. 3 cycles / minute
- B. 6 cycles / minute
- C. 9 cycles / minute
- D. 12 cycles / minute

93 Under normal conditions, frequency of slow wave cycles in the duodenum is ?*Harrison's 18th Ed. 301*

- A. 4 cycles / minute
- B. 8 cycles / minute
- C. 11 cycles / minute
- D. 15 cycles / minute

Under normal conditions, distally migrating gut contractions, the slow wave, occur at 3 cycles/minute in the stomach and 11 cycles/minute in duodenum.

94 Which of the following is termed the chemoreceptor trigger zone ?*Harrison's 18th Ed. 301*

- A. Area postrema
- B. Nucleus tractus solitarius
- C. Dorsal vagal nuclei
- D. Phrenic nuclei

Area postrema, a medullary nucleus, responds to bloodborne emetic stimuli and is termed the chemoreceptor trigger zone.

95 Which of the following act on the area postrema ?*Harrison's 18th Ed. 301*

- A. Uremia
- B. Hypoxia
- C. Ketoacidosis
- D. All of the above

Uremia, hypoxia, and ketoacidosis act on the area postrema and are emetogenic.

96 Neurotransmitter that mediate induction of vomiting in labyrinthine disorders is ?*Harrison's 18th Ed. 301*

- A. Muscarinic M₁ receptors
- B. Histaminergic H₂ receptors
- C. Serotonin 5-HT₃ receptors
- D. Dopamine D₂ receptors

Neurotransmitters that mediate induction of vomiting in labyrinthine disorders is vestibular muscarinic M_1 and histaminergic H_1 receptors, whereas vagal afferent stimuli activate serotonin $5-HT_3$ receptors. Area postrema is richly served by nerves acting on $5-HT_3$, M_1 , H_1 , and dopamine D_2 subtypes.

97 Gastroparesis occurs after which of the following ?

Harrison's 18th Ed. 301

- A. Pancreatic adenocarcinoma
- B. Mesenteric vascular insufficiency
- C. Scleroderma
- D. All of the above

Gastroparesis or a delay in gastric emptying of food occurs after vagotomy, with pancreatic adenocarcinoma, with mesenteric vascular insufficiency, or in systemic diseases such as diabetes, scleroderma, and amyloidosis. Anorexia nervosa, bulimia nervosa, anxiety, and depression may cause significant nausea that may be associated with delayed gastric emptying.

98 Gastroparesis does not occur with which of the following ?

Harrison's 18th Ed. 301

- A. Diabetes
- B. Amyloidosis
- C. Scleroderma
- D. Cyclic vomiting syndrome

Cyclic vomiting syndrome produces periodic discrete episodes of relentless nausea & vomiting and has a strong association with migraine headaches. Cyclic vomiting is most common in children, although adult cases occur in association with rapid gastric emptying & with chronic cannabis use.

99 Which of the following drugs is a highly emetogenic agent ?

Harrison's 18th Ed. 302

- A. Digoxin
- B. Oral contraceptives
- C. Cisplatin
- D. Erythromycin

Acute emesis from intensely emetogenic cisplatin is mediated by $5-HT_3$ pathways.

100 What proportion of pregnant women experience nausea in the first trimester ?

Harrison's 18th Ed. 302

- A. 25 %
- B. 50 %
- C. 70 %
- D. 90 %

Nausea affects 70% of pregnant women in first trimester.

101 Relief of abdominal pain by emesis is characteristic of ?

Harrison's 18th Ed. 302

- A. Pancreatitis
- B. Zenker's diverticulum
- C. Gastric obstruction
- D. Intestinal obstruction

Relief of abdominal pain by emesis characterizes intestinal obstruction, whereas vomiting has no effect on pancreatitis or cholecystitis pain.

102 Which of the following antiemetic agent is a Serotonin $5-HT_3$ antagonist ?

Harrison's 18th Ed. 302

- A. Meclizine
- B. Granisetron

- C. Mirtazapine
- D. Dimenhydrinate

Antiemetic agent ondansetron and granisetron are Serotonin $5-HT_3$ antagonists. Meclizine & dimenhydrinate are antihistamines. Scopolamine is an anticholinergic drug.

103 Which of the following is a combined $5-HT_4$ agonist and D_2 antagonist ?

Harrison's 18th Ed. 304

- A. Metoclopramide
- B. Domperidone
- C. Erythromycin
- D. Octreotide

Metoclopramide is a combined $5-HT_4$ agonist & D_2 antagonist. Domperidone is a D_2 antagonist. Erythromycin increases gastroduodenal motility by action on receptors for motilin. Somatostatin analogue octreotide induces propagative small intestinal motor complexes.

104 Which of the following is a Neurokinin NK_1 antagonist ?

Harrison's 18th Ed. 304

- A. Aprepitant
- B. Kevetiracetam
- C. Cyproheptadine
- D. Sumatriptan

Aprepitant is a neurokinin NK_1 antagonist that has antiemetic & antinausea effects during acute and delayed periods after chemotherapy.

105 Gastric pits of stomach branch into ?

Harrison's 18th Ed. 2438

- A. 1 or 2 gastric glands
- B. 3 or 4 gastric glands
- C. 4 or 5 gastric glands
- D. 6 or 7 gastric glands

Microscopic gastric pits (foveolus) of gastric epithelial lining branch into four or five gastric glands made up of highly specialized epithelial cells.

106 Which of the following cells is found deepest in the oxyntic gastric gland ?

Harrison's 18th Ed. 2438 Figure 293-1

- A. Mucous neck cells
- B. Parietal cells
- C. Endocrine cells
- D. Chief cells

107 Parietal cell is also known as ?

Harrison's 18th Ed. 2438

- A. Mucous cell
- B. Oxyntic cell
- C. Endocrine cell
- D. Enterochromaffin-like (ECL) cell

Parietal cell is also known as oxyntic cell and is found in neck, or isthmus, or in oxyntic gland.

108 Peptic ulcer disease (PUD) occurs due to constant attack on gastroduodenal mucosa by all noxious agents except ?

Harrison's 18th Ed. 2438

- A. Acid
- B. Pepsin
- C. Bile acids
- D. Salivary amylase

109 PUD occurs due to constant attack on gastroduodenal mucosa by all noxious agents except ?

Harrison's 18th Ed. 2438

- A. Pancreatic enzymes
- B. Alcohol
- C. Virus
- D. Bacteria

PUD occurs due to constant attack on gastroduodenal mucosa by endogenous noxious agents like acid, pepsin, bile acids, pancreatic enzymes or exogenous substances like medications, alcohol & bacteria.

110 Which of the following is an element of gastric mucosal defense system ?

Harrison's 18th Ed. 2438

- A. Preepithelial
- B. Epithelial
- C. Subepithelial
- D. All of the above

Gastric mucosal defense is a 3-level barrier composed of preepithelial, epithelial & subepithelial elements.

111 First line of defense of gastric epithelium is ?

Harrison's 18th Ed. 2438

- A. Mucus layer
- B. Bicarbonate-phospholipid layer
- C. Phospholipid layer
- D. Mucus-bicarbonate-phospholipid layer

The first line of defense of gastric epithelium is a mucus-bicarbonate-phospholipid layer that serves as a physicochemical barrier. Surface epithelial cells provide the next line of defense.

112 Surface epithelial cells generate which of the following ?

Harrison's 18th Ed. 2439

- A. Heat shock proteins
- B. Trefoil factor family (TFF) peptides
- C. Cathelicidins
- D. All of the above

Surface epithelial cells generate heat shock proteins that prevent protein denaturation, trefoil factor family peptides and cathelicidins, which play a role in surface cell protection and regeneration.

113 Trefoil factor family (TFF) peptides were formerly known as ?

- A. C-domain peptides
- B. D-domain peptides
- C. G-domain peptides
- D. P-domain peptides

Trefoil factor family (TFF) peptides were formerly called P-domain peptides promote wound healing in the gut through epithelial restitution. TFF peptides are found in mucous membranes of stomach, conjunctiva, Brunner's glands, intestine, salivary glands, uterus, and respiratory tract.

114 Cathelicidin is best related to ?

- A. P-domain peptides
- B. Antimicrobial peptides (AMPs)
- C. Angiogenesis
- D. All of the above

Antimicrobial peptides (AMPs) have the capacity to rapidly inactivate infectious agents. The two major AMP families in mammals are the defensins and cathelicidin peptides.

115 Restitution of gastric mucosa means ?

Harrison's 18th Ed. 2439

- A. Proliferation of damaged gastric mucosa
- B. Regeneration of damaged gastric mucosa
- C. Migration of normal gastric epithelium to damaged areas
- D. All of the above

Restitution is migration of gastric epithelial cells bordering site of injury when preepithelial barrier is breached.

116 Which of the following statements about restitution is false ?

Harrison's 18th Ed. 2439

- A. Occurs independent of cell division
- B. Requires uninterrupted blood flow
- C. Requires an alkaline pH in surroundings
- D. None of the above

Restitution occurs independent of cell division and requires uninterrupted blood flow and an alkaline pH in the surrounding environment.

117 Restitution of gastric mucosa is modulated by ?

Harrison's 18th Ed. 2439

- A. Epidermal growth factor (EGF)
- B. Transforming growth factor alpha (TGF- α)
- C. Fibroblast growth factor (FGF)
- D. All of the above

Growth factors like epidermal growth factor (EGF), transforming growth factor (TGF) alpha and basic fibroblast growth factor (FGF) modulate restitution.

118 Gastric epithelial cell regeneration is regulated by ?

Harrison's 18th Ed. 2439

- A. Prostaglandins
- B. Epidermal growth factor (EGF)
- C. Transforming growth factor-alpha (TGF- α)
- D. All of the above

Larger defects not effectively repaired by restitution require cell proliferation. Epithelial cell regeneration is regulated by prostaglandins, EGF & TGF-alpha.

119 Bicarbonate secretion in stomach is stimulated by all except ?

Harrison's 16th Ed. 1747

- A. Calcium
- B. Prostaglandins
- C. VIP
- D. Luminal acidification

120 Which of the following plays a central role in gastric epithelial defense / repair ?

Harrison's 18th Ed. 2440

- A. Mucosal bicarbonate
- B. Mucus
- C. Prostaglandins
- D. Growth factor

121 Prostaglandins are important in gastric epithelial defense / repair due to all except ?

Harrison's 18th Ed. 2440

- A. Release of mucosal bicarbonate and mucus
- B. Inhibition of parietal cell secretion

- C. Maintaining mucosal lymphatic flow
- D. Epithelial cell restitution

Pg's in gastric mucosa play a central role in gastric epithelial defense/repair. Pg regulate release of mucosal bicarbonate & mucus, inhibit parietal cell secretion & maintain mucosal blood flow & epithelial cell restitution.

122 Key enzyme that controls the rate-limiting step in prostaglandin synthesis is ?

Harrison's 18th Ed. 2440

- A. Thromboxane A₂ (TXA₂)
- B. Phospholipase A₂
- C. Cyclooxygenase (COX)
- D. Prostacyclin (PGI₂)

Key enzyme that controls the rate-limiting step in prostaglandin synthesis is cyclooxygenase (COX). COX is present in two isoforms - COX-1 and COX-2.

123 COX-1 is expressed in all except ?

Harrison's 18th Ed. 2440

- A. Stomach
- B. Platelets
- C. Kidneys
- D. Liver

COX-1 is expressed in stomach, platelets, kidneys, and endothelial cells. Gastro-intestinal mucosal ulceration & renal dysfunction is due to inhibition of COX-1.

124 COX-2 is expressed in all except ?

Harrison's 18th Ed. 2440

- A. Macrophages
- B. Leukocytes
- C. Platelets
- D. Synovial cells

COX-2, induced by inflammatory stimuli is expressed in macrophages, leukocytes, fibroblasts & synovial cells.

125 Which of the following about acid production in stomach is false ?

Harrison's 18th Ed. 2440

- A. Basal acid production occurs in a circadian pattern
- B. Cholinergic & histaminergic input are the principal contributors to basal acid secretion
- C. Stimulated gastric acid secretion occurs in cephalic, gastric & intestinal phases
- D. Cephalic phase stimulates gastric secretion via hormones

Cephalic phase stimulates gastric secretion via vagus nerve.

126 Which of the following about acid production in stomach is false ?

Harrison's 18th Ed. 2440

- A. Cephalic phase stimulates gastric secretion via vagus
- B. Gastric phase is activated when food enters stomach
- C. Amino acids stimulate vagus to release gastrin
- D. Intestinal phase is mediated by luminal distention

Gastric phase is activated once food enters stomach. Amino acids and amines directly stimulate G cell to release gastrin, which in turn activate parietal cell.

127 Somatostatin acts by ?

Harrison's 18th Ed. 2440

- A. Direct inhibition of parietal cells
- B. Decreased histamine release from ECL cells
- C. Decreased gastrin release from G cells
- D. All of the above

Somatostatin is released from endocrine cells in gastric mucosa (D cells) in response to HCl. Somatostatin inhibits acid production by direct action on parietal cell, decreased histamine release from enterochromaffin-like (ECL) cells and gastrin release from G cells.

128 Which of the following about parietal cells is false ?

Harrison's 18th Ed. 2440

- A. Located in oxyntic gland
- B. Does not secrete intrinsic factor
- C. Express receptors for histamine, gastrin & acetylcholine
- D. Express receptors for ligands that inhibit acid production

Acid-secreting parietal cell also secretes intrinsic factor (IF).

129 Gastric acid production is inhibited by ?

Harrison's 18th Ed. 2440

- A. Prostaglandins
- B. Somatostatin
- C. EGF
- D. All of the above

Gastric acid production is inhibited by prostaglandins, somatostatin & epidermal growth factor (EGF).

130 Which of the following statements about enzyme H⁺, K⁺-ATPase is false ?

Harrison's 18th Ed. 2441

- A. Responsible for generating large concentration of H⁺
- B. Membrane-bound protein consisting of α & β subunits
- C. Active catalytic site is found within α subunit
- D. Active catalytic site is found within β subunit

Active catalytic site is found within α subunit.

131 Which of the following statements about enzyme H⁺, K⁺-ATPase is false ?

Harrison's 18th Ed. 2441

- A. Transfers H⁺ ions from parietal cell cytoplasm to secretory canaliculi in exchange for K⁺
- B. Located within secretory canaliculus & in nonsecretory cytoplasmic tubulovesicles
- C. Tubulovesicles are impermeable to K⁺
- D. At rest, 50% of pumps are within secretory canaliculus

Distribution of proton pumps between nonsecretory vesicles & secretory canaliculus varies according to parietal cell activity. They are recycled back to inactive state in cytoplasmic vesicles once parietal cell activation ceases.

132 Which of the following about chief cell is false ?

Harrison's 18th Ed. 2441

- A. Found primarily in gastric fundus
- B. Synthesize & secrete pepsinogen
- C. Acid environment converts pepsinogen to pepsin
- D. Pepsin activity is irreversibly inactivated & denatured at a pH of >=4

Pepsin activity is significantly diminished at a pH of 4 and irreversibly inactivated and denatured at a pH of 7.

133 All of the following about gastric ulcer are true except ?

Harrison's 18th Ed. 2441

- A A break in mucosal surface >5 mm in size
- B Depth to submucosa
- C More than half of gastric ulcers occur in males
- D Peak incidence is in the 4th decade of life

Gastric & duodenal ulcers are defined as breaks in mucosal surface >5 mm in size with depth to submucosa. Peak incidence of gastric ulcers is in the sixth decade & more than half of GUs occur in males.

134 Which of the following statements about GU is false ?

Harrison's 18th Ed. 2441

- A Can represent malignancy
- B Benign GUs are found distal to junction between antrum & acid secretory mucosa
- C Benign GUs are common in gastric fundus
- D Gastric acid output is normal or decreased in GU

Benign GUs are rare in the gastric fundus.

135 ~90% of DU's occur within what distance from pylorus ?

Harrison's 18th Ed. 2441

- A 3 cm
- B 5 cm
- C 7 cm
- D 9 cm

~90% of DU's are located within 3 cm of the pylorus.

136 Which of the following statements about DU is false ?

Harrison's 18th Ed. 2441

- A Most often occur in first part of duodenum
- B Usually <=1 cm in diameter
- C Malignant DUs are extremely rare
- D Base of ulcer consists of neutrophilic necrosis with surrounding fibrosis

Base of DU consists of a zone of eosinophilic necrosis with surrounding fibrosis. Malignant DUs are very rare.

137 Type IV Gastric Ulcers are found in ?

Harrison's 18th Ed. 2442

- A Cardia
- B Gastric body
- C Gastric antrum
- D Pylorus

Gastric ulcers are classified based on their location. Type I occur in gastric body, type II occur in antrum, type III occur within 3 cm of pylorus and type IV are found in the cardia.

138 Which of the following Gastric Ulcers has high gastric acid production ?

Harrison's 18th Ed. 2442

- A Type I
- B Type II
- C Type III

D. Type IV

Type III GU's occur within 3 cm of the pylorus and are commonly accompanied by duodenal ulcers and normal or high gastric acid production.

139 Helicobacter pylori was discovered by ?

N Engl J Med 2005;35:2421

- A Marshall B & Warren R
- B Julie Parsonnet & Jennings R
- C Banatvala N & Mayo K
- D Deeks JJ & Feldman RA

140 Gastric infection with H. pylori can lead to ?

Harrison's 18th Ed. 2442

- A Peptic ulcer disease (PUD)
- B Gastric mucosal-associated lymphoid tissue lymphoma
- C Gastric adenocarcinoma
- D All of the above

H. pylori plays a role in the development of majority of PUD, gastric mucosal-associated lymphoid tissue (MALT) lymphoma and gastric adenocarcinoma.

141 Which of the following statements about H. pylori is false ?

Harrison's 18th Ed. 2442

- A It is a gram-positive microaerophilic rod
- B Found between mucous layer & gastric epithelium
- C Normally, it does not invade gastric epithelial cells
- D S-shaped & contains multiple sheathed flagella

H. pylori is a gram-negative microaerophilic rod found most commonly between the mucous layer and the gastric epithelium.

142 Which of the following statements about H. pylori is false ?

Harrison's 18th Ed. 2442

- A H. pylori should be eradicated in documented PUD
- B No single agent is effective in eradicating H. pylori
- C Rifabutin used to treat resistant strains of H. pylori
- D H. pylori is implicated in pathogenesis of acute pancreatitis

143 pH-gated urea channel in H. pylori bacterium is called ?

N Engl J Med 2002;347,1175

- A UreI
- B UreJ
- C UreK
- D UreL

144 Which of the following statements about H. pylori is false ?

Harrison's 18th Ed. 2442

- A Its genome contains 1.65 million base pairs
- B May transform into coccoid dormant form
- C Produces urease to convert urea to NH_3 and water
- D Single strain of H. pylori exist

Multiple strains of H. pylori exist. Different diseases related to H. pylori infection can be attributed to different strains with distinct pathogenic features.

145 Which of the following statements about H. pylori is false ?

N Engl J Med 2002;347,1175, Harrison's 18th Ed. 2442

- A 80% population by age 20 years is infected in developing countries

- B. Transmission occurs through faeco-oral route
- C. Infection is associated with chronic active gastritis
- D. BabA is vital for entry into gastric epithelial cell

146 Which of the following statements about H. pylori is false ?

Harrison's 18th Ed. 2443

- A. Express vacuolating cytotoxin VacA
- B. Cag A and pic B are virulence factors
- C. Its LPS has high immunologic activity
- D. Neutrophil response is strong in acute & chronic H. pylori infection

147 Which out of the following factors has a central role in H. pylori infection ?

N Engl J Med 2002;347,1175

- A. Interleukin-1 β
- B. Interleukin-2
- C. Interleukin-6
- D. Interleukin-8

148 Which of the following statements about H. pylori is false ?

N Engl J Med 2002;347, 1175

- A. Most pathogenic strains contain VacA pathogenicity island
- B. 5 of its genes are similar to Agrobacterium tumefaciens
- C. Pathogenicity island proteins are involved in interleukin-8 production by gastric epithelial cells
- D. Pathogenicity island proteins are involved in translocation of CagA from bacterium into host cell

149 Adhesins for H. pylori include all except ?

N Engl J Med 2002;347,1175, Harrison's 18th Ed. 2442

- A. BabA
- B. AlpA
- C. AlpB
- D. HopY

150 Which of the following statements about H. pylori is false ?

Harrison's 18th Ed. 2442

- A. H. pylori is usually acquired in childhood
- B. Acute infection causes transient hypochlorhydria
- C. 80-90% with chronic gastritis will never have symptoms
- D. After eradication, reinfection rates are high

Reinfection after successful eradication of H. pylori is rare in US. If recurrent infection occurs within first 6 months after completing therapy, most likely explanation is recrudescence and not reinfection.

151 Which of the following enzymes is not related to H. pylori-induced gastrointestinal disease ?

Harrison's 18th Ed. 2442 Figure 293-6

- A. Urease
- B. VacA
- C. GAD
- D. CagA

Bacterial enzymes that cause H. pylori - induced gastrointestinal disease are Urease, VacA & CagA.

152 Chronic H. pylori infection may lead to ?

Harrison's 18th Ed. 2443 Figure 293-8

- A. Antral predominant gastritis
- B. Nonatrophic pangastritis
- C. Corpus predominant atrophic gastritis
- D. All of the above

153 Asymptomatic H. pylori infection may be a consequence of ?

Harrison's 18th Ed. 2443 Figure 293-8

- A. Antral predominant gastritis
- B. Nonatrophic pangastritis
- C. Corpus predominant atrophic gastritis
- D. All of the above

154 Which of the following consequences of chronic H. pylori infection leads to gastric cancer ?

Harrison's 18th Ed. 2443 Figure 293-8

- A. Antral predominant gastritis
- B. Nonatrophic pangastritis
- C. Corpus predominant atrophic gastritis
- D. All of the above

Chronic H. pylori infection leading to corpus predominant atrophic gastritis going on to intestinal metaplasia is an important predisposing factor for gastric cancer.

155 Which of the following consequences of chronic H. pylori infection leads to DU ?

Harrison's 18th Ed. 2443 Figure 293-8

- A. Antral predominant gastritis
- B. Nonatrophic pangastritis
- C. Corpus predominant atrophic gastritis
- D. All of the above

Presence of antral-predominant gastritis is associated with DU formation.

156 Which of the following consequences of chronic H. pylori infection leads to MALT lymphoma ?

Harrison's 18th Ed. 2443 Figure 293-8

- A. Antral predominant gastritis
- B. Nonatrophic pangastritis
- C. Corpus predominant atrophic gastritis
- D. All of the above

Chronic infection with H. pylori is associated with development of a low-grade B cell lymphoma, gastric MALT lymphoma. (MALT refers to mucosal-associated lymphoid tissue).

157 Which of the following about NSAIDs induced disease is false ?

Harrison's 18th Ed. 2444 Table 293-5

- A. NSAID-related GUs not accompanied by chronic active gastritis
- B. No dose of NSAID is completely safe
- C. Misoprostol is useful for active treatment
- D. Selective COX-2 inhibitor useful in prophylactic therapy

Primary prevention of NSAID-induced ulceration can be accomplished by misoprostol or a PPI.

158 Risk factors that increase morbidity and mortality related to NSAID usage are all except ?

Harrison's 18th Ed. 2444

- A. Advanced age

- B. History of PUD
- C. Concomitant use of iron
- D. Multisystem disease

159 Risk factors that increase morbidity and mortality related to NSAID usage are all except ?

Harrison's 18th Ed. 2444

- A. High dose NSAIDs
- B. Multiple NSAIDs
- C. Concomitant use of anticoagulants
- D. Spicy food

Established risk factors for serious gastrointestinal complications from NSAIDs include advanced age, history of ulcer, concomitant use of glucocorticoids, high-dose NSAIDs, multiple NSAIDs, concomitant use of anticoagulants, and serious or multisystem disease. Possible risk factors include concomitant infection with H. pylori, cigarette smoking, and alcohol consumption.

160 Disorders that are associated with PUD include all except ?

Harrison's 18th Ed. 2444

- A. Systemic mastocytosis
- B. Chronic pulmonary disease
- C. Chronic renal failure
- D. Acute pancreatitis

161 Disorders that are associated with PUD include all except ?

Harrison's 18th Ed. 2444

- A. Cirrhosis
- B. Nephrolithiasis
- C. Hyperthyroidism
- D. α 1 antitrypsin deficiency

Chronic disorders that have a strong association with PUD are systemic mastocytosis, chronic pulmonary disease, chronic renal failure, cirrhosis, nephrolithiasis, and alpha₁-antitrypsin deficiency. Those with a possible association are hyperparathyroidism, coronary artery disease, polycythemia vera, and chronic pancreatitis.

162 The typical pain pattern in DU occurs ?

Harrison's 18th Ed. 2445

- A. 15 minutes to 1 hour after a meal
- B. 30 minutes to 2 hour after a meal
- C. 60 minutes to 3 hour after a meal
- D. 90 minutes to 3 hour after a meal

Typical pain pattern in DU occurs 90 minutes to 3 hours after a meal and is frequently relieved by antacids or food. Pain that awakes the patient from sleep (between midnight and 3 AM) is the most discriminating symptom. In GU, nausea & weight loss occur more commonly & discomfort may be precipitated by food.

163 Most common complication observed in PUD is ?

Harrison's 18th Ed. 2445

- A. Gastrointestinal bleeding
- B. Perforation
- C. Gastric Outlet Obstruction
- D. Malignancy

Gastrointestinal bleeding is the most common complication observed in PUD followed by perforation and gastric outlet obstruction.

164 Out of the following, which is the least common ulcer-related complication ?

Harrison's 18th Ed. 2445

- A. Gastric outlet obstruction

- B. Gastrointestinal bleeding
- C. Perforation
- D. Malignancy

Gastric outlet obstruction is the least common ulcer-related complication.

165 GUs tend to perforate into the ?

Harrison's 18th Ed. 2445

- A. Spleen
- B. Pancreas
- C. Left hepatic lobe
- D. Left kidney

GUs tend to penetrate into the left hepatic lobe while DUs tend to penetrate posteriorly into pancreas.

166 Non ulcer dyspepsia is typified by ?

Harrison's 18th Ed. 2445

- A. Heartburn
- B. Upper abdominal pain
- C. Abdominal distension
- D. Loss of appetite

NUD (functional dyspepsia / essential dyspepsia) is typified by upper abdominal pain without presence of ulcer.

167 Tests for diagnosing H. pylori include ?

Harrison's 18th Ed. 2446

- A. Biopsy urease test
- B. Fecal H. pylori antigen test
- C. ¹³C- or ¹⁴C-urea breath test
- D. All of the above

Tests for diagnosing H. pylori include serologic testing, ¹³C- or ¹⁴C-urea breath test & fecal H. pylori (Hp) antigen test. urinary Hp antigen test & monoclonal antibody stool antigen test appear promising.

168 Milk-alkali syndrome includes all except ?

Harrison's 18th Ed. 2447

- A. Hypercalcemia
- B. Hypophosphatemia
- C. Renal calcinosis
- D. Progression to renal insufficiency

Milk-alkali syndrome comprises of hypercalcemia, hyperphosphatemia, possible renal calcinosis & progression to renal insufficiency.

169 Structure of H₂ receptor antagonists share homology with ?

Harrison's 18th Ed. 2447

- A. Pepsin
- B. Secretin
- C. Gastrin
- D. Histamine

H₂ receptor antagonists (cimetidine, ranitidine, famotidine & nizatidine) have structural homology with histamine.

170 Proton Pump Inhibitors may interfere with absorption of ?

Harrison's 18th Ed. 2447

- A. Ketoconazole
- B. Iron
- C. Digoxin

D. All of the above

PPIs may interfere with absorption of ketoconazole, ampicillin, iron & digoxin.

171 Hepatic cytochrome P450 can be inhibited by ?

Harrison's 18th Ed. 2447

- A. Lansoprazole
- B. Rabeprazole
- C. Pantoprazole
- D. Esomeprazole

Hepatic cytochrome P450 can be inhibited by omeprazole & lansoprazole and not by Rabeprazole, pantoprazole and esomeprazole.

172 Long-term acid suppression with PPIs has been associated with a higher incidence of ?

Harrison's 18th Ed. 2449

- A. Bacterial meningitis
- B. Community-acquired pneumonia
- C. Urinary tract infection
- D. Gall stones

Long-term acid suppression with PPIs is associated with higher incidence of community-acquired pneumonia.

173 PPI containing an imidazopyridine ring instead of a benzimidazole ring is ?

Harrison's 18th Ed. 2448

- A. Rabeprazole
- B. Pantoprazole
- C. Tenatoprazole
- D. Esomeprazole

Tenatoprazole is a PPI containing an imidazopyridine ring instead of a benzimidazole ring.

174 Which of the following is false about Sucralfate ?

Harrison's 18th Ed. 2449

- A. Complex sucrose salt
- B. Insoluble in water
- C. To be avoided in chronic renal insufficiency
- D. None of the above

175 Black stools & darkening of tongue are adverse effects of ?

Harrison's 18th Ed. 2449

- A. Misoprostol
- B. Sucralfate
- C. Colloidal bismuth subcitrate (CBS)
- D. Proton Pump Inhibitors (PPI)

Adverse effects with short-term usage of Colloidal bismuth subcitrate (CBS) and bismuth subsalicylate (BSS) include black stools, constipation and darkening of tongue.

176 Combination therapy for H. pylori infection should be given for a period of ?

Harrison's 18th Ed. 2449

- A. 7 days
- B. 14 days
- C. 21 days
- D. 28 days

Combination therapy for H. pylori infection for 14 days provides the greatest efficacy.

177 First triple regimen therapy against H. pylori was ?

Harrison's 18th Ed. 2450

- A. Amoxicillin + omeprazole + metronidazole
- B. Bismuth + metronidazole + tetracycline
- C. Clarithromycin + omeprazole + metronidazole
- D. Lansoprazole + clarithromycin + amoxicillin

First triple regimen therapy against H. pylori was bismuth, metronidazole & tetracycline.

178 Which of the following is a treatment regimen for eradication of H. pylori infection ?

Harrison's 18th Ed. 2450

- A. Triple therapy
- B. Quadruple Therapy
- C. Sequential therapy
- D. All of the above

179 Which of the following can heal GUs or DUs, independent of whether NSAIDs are discontinued ?

Harrison's 18th Ed. 2450

- A. H₂ receptor antagonist
- B. PPIs
- C. Misoprostol
- D. Sucralfate

Only PPIs can heal GUs or DUs, independent of whether NSAIDs are discontinued.

180 Test of choice for documenting eradication of H. pylori is ?

Harrison's 18th Ed. 2451

- A. Biopsy urease test
- B. Fecal H. pylori antigen test
- C. ¹³C- or ¹⁴C-urea breath test
- D. Urinary Hp antigen test

The test of choice for documenting eradication is the urea breath test (UBT).

181 A GU is considered refractory if it fails to heal after how many weeks of therapy ?

Harrison's 18th Ed. 2452

- A. 4 weeks
- B. 8 weeks
- C. 12 weeks
- D. 16 weeks

182 A DU is considered refractory if it fails to heal after how many weeks of therapy ?

Harrison's 18th Ed. 2452

- A. 4 weeks
- B. 8 weeks
- C. 12 weeks
- D. 16 weeks

GU that fails to heal >12 weeks & a DU that does not heal >8 weeks of therapy is considered refractory.

183 Etiologies of refractory ulcers (GU / DU) include all except ?

Harrison's 18th Ed. 2452

- A. Ischemia
- B. Crohn's disease

- C. Ulcerative colitis
- D. Amyloidosis

184 Etiologies of refractory ulcers (GU / DU) include all except ?

Harrison's 18th Ed. 2452

- A. Sarcoidosis
- B. Lymphoma
- C. Eosinophilic gastroenteritis
- D. HIV

185 Etiologies of refractory ulcers (GU / DU) include all except ?

Harrison's 18th Ed. 2452

- A. Leprosy
- B. Cytomegalovirus (CMV)
- C. Tuberculosis
- D. Syphilis

Rare etiologies of refractory GU/DU's include ischemia, Crohn's disease, amyloidosis, sarcoidosis, lymphoma, eosinophilic gastroenteritis, cytomegalovirus (CMV), tuberculosis or syphilis.

186 Posterior DU can penetrate into ?

Harrison's 18th Ed. 2452

- A. Pancreas
- B. Colon
- C. Liver
- D. All of the above

Posterior DU can penetrate into pancreas, colon, liver or biliary tree.

187 Which of the following is not a typical feature of Zollinger–Ellison Syndrome (ZES) ?

Harrison's 18th Ed. 2454-5

- A. Gastrin release from beta cell endocrine tumor
- B. Hypergastrinemia
- C. Erosive esophagitis
- D. Diarrhea

Severe peptic ulcer secondary to gastric acid hypersecretion due to unregulated gastrin release from a autonomous non-beta cell endocrine tumor (gastrinoma) defines ZES. The increased gastric acid output leads to peptic ulcer diathesis, erosive esophagitis, and diarrhea.

188 In ZES, majority of patients are diagnosed between the ages of ?

Harrison's 18th Ed. 2455

- A. 01 and 10 years
- B. 10 and 30 years
- C. 30 and 50 years
- D. 50 and 70 years

In ZES, males are more commonly affected than females, and majority of patients are diagnosed between the ages of 30 and 50 years.

189 Which of the following is the action of gastrin ?

Harrison's 18th Ed. 2455

- A. Stimulates acid secretion through gastrin receptors on parietal cells
- B. Stimulates acid secretion by inducing histamine release from ECL cells
- C. Has a trophic action on gastric epithelial cells
- D. All of the above

Gastrin stimulates acid secretion through gastrin receptors on parietal cells and by inducing histamine release from ECL cells. Gastrin also has a trophic action on gastric epithelial cells.

190 'Gastrinoma triangle' is formed by all except ?

Harrison's 18th Ed. 2455

- A. Cystic and common bile ducts
- B. Junction of II and III portions of duodenum
- C. Inferior surface of liver
- D. Junction of neck & body of pancreas

Hypothetical gastrinoma triangle is formed by confluence of cystic & common bile ducts superiorly, junction of second & third portions of duodenum inferiorly, and junction of neck & body of pancreas medially.

191 What proportion of gastrinoma are found within the hypothetical gastrinoma triangle ?

Harrison's 18th Ed. 2455

- A. 20 %
- B. 40 %
- C. 60 %
- D. 80 %

Over 80% of gastrinoma are found within the hypothetical gastrinoma triangle.

192 Which of the following is the most common extrapancreatic site of gastrinoma ?

Harrison's 18th Ed. 2455

- A. Stomach
- B. Duodenum
- C. Liver
- D. Lymph nodes

Duodenal gastrinoma tumors constitute the most common nonpancreatic lesion (50 to 75%). Less-common extrapancreatic sites include stomach, bones, ovaries, heart, liver, and lymph nodes.

193 What proportion of gastrinoma are malignant ?

Harrison's 18th Ed. 2455

- A. 20 %
- B. 40 %
- C. 60 %
- D. 80 %

More than 60% of gastrinoma tumors are considered malignant, with up to 30–50% of patients having multiple lesions or metastatic disease at presentation.

194 Which of the following suggest the diagnosis of ZES ?

Harrison's 17th Ed. 1868

- A. Ulcer in II part of duodenum & beyond
- B. Ulcers refractory to standard medical therapy
- C. Ulcer presenting with frank complication
- D. All of the above

Gastrinoma should be suspected when ulcers occur unusual locations like II part of duodenum & beyond, ulcers refractory to standard medical therapy, ulcer recurrence after acid-reducing surgery, ulcers presenting with frank complications (bleeding, obstruction, and perforation), or ulcers in the absence of *H. pylori* or NSAID ingestion.

195 What proportion of ZES patients have diarrhoea ?

Harrison's 18th Ed. 2455

- A. 25 %
- B. 50 %
- C. 75 %

D. 100 %

Diarrhea is the next most common clinical manifestation after peptic ulcer and is found in up to 50% of patients of ZES.

196 Etiology of the diarrhea in ZES is ?

Harrison's 18th Ed. 2455

- A. Volume overload to the small bowel
- B. Pancreatic enzyme inactivation by acid
- C. Damage of the intestinal epithelial surface by acid
- D. All of the above

In ZES, etiology of diarrhea is multifactorial, resulting from marked volume overload to small bowel, pancreatic enzyme inactivation by acid & damage of intestinal epithelial surface by acid.

197 Organs involved in MEN I syndrome are all except ?

Harrison's 18th Ed. 2455

- A. Parathyroid
- B. Thyroid
- C. Pancreas
- D. Pituitary

MEN I syndrome (autosomal dominant) involves parathyroid glands (80-90%), pancreas (40-80%), and pituitary gland (30-60%).

198 Genetic defect in MEN I is in ?

Harrison's 18th Ed. 2455

- A. Short arm of chromosome 11
- B. Long arm of chromosome 11
- C. Short arm of chromosome 12
- D. Long arm of chromosome 12

The genetic defect in MEN I is in the long arm of chromosome 11 (11q11-q13).

199 Distinguishing feature between MEN I & sporadic ZES is ?

Harrison's 18th Ed. 2455

- A. Incidence of gastric carcinoid tumor
- B. Size, number & location of gastrinoma
- C. Disease free period after surgery
- D. All of the above

Gastrinomas tend to be smaller, multiple, and located in the duodenal wall more often than is seen in patients with sporadic ZES. An additional distinguishing feature in ZES patients with MEN I is the higher incidence of gastric carcinoid tumor development (as compared to patients with sporadic gastrinomas). Gastrinomas tend to be smaller, multiple, and located in the duodenal wall more often than is seen in patients with sporadic ZES.

200 Patients with gastrinoma have gastrin level more than ?

Harrison's 18th Ed. 2455

- A. 25 pg/mL
- B. 50 pg/mL
- C. 100 pg/mL
- D. 150 pg/mL

Fasting gastrin levels are <150 pg/mL. All gastrinoma patients have a gastrin level >150 - 200 pg/mL.

201 Elevated fasting gastrin level are due to all except ?

Harrison's 18th Ed. 2455

- A. Hypochlorhydria
- B. Renal insufficiency
- C. Diabetes mellitus
- D. Hypertension

202 Elevated fasting gastrin level are due to all except ?

Harrison's 18th Ed. 2455

- A. Rheumatoid arthritis
- B. Ankylosing arthritis
- C. Pheochromocytoma
- D. Vitiligo

Elevated fasting gastrin level are due to gastric hypochlorhydria or achlorhydria, renal insufficiency, massive small-bowel obstruction, rheumatoid arthritis, vitiligo, diabetes mellitus & pheochromocytoma.

203 Patients with gastrinoma have a BAO level more than ?

Harrison's 16th Ed. 1759

- A. 4 meq/hour
- B. 8 meq/hour
- C. 12 meq/hour
- D. 15 meq/hour

204 What value of BAO / MAO is highly suggestive of ZES ?

Harrison's 18th Ed. 2456

- A. < 0.3
- B. < 0.6
- C. > 0.3
- D. > 0.6

BAO/MAO ratio >0.6 is highly suggestive of ZES, but a ratio <0.6 does not exclude the diagnosis.

205 What level of basal gastric pH excludes gastrinoma ?

Harrison's 18th Ed. 2456

- A. ≥ 1
- B. ≥ 1.5
- C. ≥ 2
- D. ≥ 3

A basal gastric pH ≥ 3 virtually excludes a gastrinoma.

206 Which of the following is the most sensitive & specific gastrin provocative test ?

Harrison's 18th Ed. 2456

- A. Secretin stimulation test
- B. Calcium infusion study
- C. Standard meal test
- D. None of the above

Most sensitive & specific gastrin provocative test for diagnosis of gastrinoma is secretin study. Increase in gastrin of ≥ 120 pg within 15 minutes of secretin injection has a sensitivity & specificity of >90% for ZES. Calcium infusion study is less sensitive & specific with greater potential for adverse effects.

207 Which of the following tests has maximum sensitivity in detecting primary gastrinoma ?

Harrison's 18th Ed. 2456 Table 293-8

- A. Selective arterial secretin injection (SASI)
- B. Octreoscan imaging with ^{111}In -pentetreotide
- C. Endoscopic ultrasonography (EUS)
- D. Magnetic resonance imaging

Sensitivity of EUS in Zollinger-Ellison Syndrome is 80 - 100%.

208 Which of the following is a favorable prognostic indicator in ZES ?

Harrison's 18th Ed. 2457

- A. Primary duodenal wall tumor
- B. Isolated lymph node tumor
- C. Undetectable tumor upon surgical exploration
- D. All of the above

In ZES, favorable prognostic indicators include primary duodenal wall tumors, isolated lymph node tumor, and undetectable tumor upon surgical exploration. Poor outcome indicators are shorter disease duration; higher gastrin levels ($>10,000$ pg/mL); large pancreatic primary tumors (>3 cm); metastatic disease to lymph nodes, liver, and bone and Cushing's syndrome. Rapid growth of hepatic metastases is also predictive of poor outcome.

209 Procedure that provides the lowest rates of peptic ulcer recurrence but has highest complication rate is ?

Harrison's 16th Ed. 1756

- A. Vagotomy
- B. Billroth I
- C. Vagotomy in combination with antrectomy
- D. Billroth II

210 Cushing's ulcer refers to ?

Harrison's 18th Ed. 2457

- A. Stress ulceration after head trauma
- B. Stress ulceration after severe burns
- C. Stress ulceration after mechanical ventilation
- D. Stress ulceration after sepsis

Elevated gastric acid secretion may be noted in patients with stress ulceration after head trauma (Cushing's ulcer).

211 Curling's ulcer refers to ?

Harrison's 18th Ed. 2457

- A. Stress ulceration after head trauma
- B. Stress ulceration after severe burns
- C. Stress ulceration after mechanical ventilation
- D. Stress ulceration after sepsis

Elevated gastric acid secretion may be noted in patients with stress ulceration after severe burns (Curling's ulcer).

212 To avoid stress ulceration, gastric pH should be maintained at ?

Harrison's 18th Ed. 2457

- A. > 1.5
- B. > 2.0
- C. > 2.5
- D. > 3.5

Maintenance of gastric pH >3.5 with continuous infusion of H_2 blockers or liquid antacids administered every 2–3 hours are viable options to avoid stress ulceration.

213 Treatment of choice for stress ulcer prophylaxis is ?

Harrison's 18th Ed. 2457

- A. H_2 blocker
- B. PPI
- C. Sucralfate
- D. All of the above

PPIs are the treatment of choice for stress ulcer prophylaxis.

214 'Phlegmonous gastritis' refers to ?

Harrison's 18th Ed. 2457

- A. Viral infection of stomach

- B. Bacterial infection of stomach
- C. Vascular congestion of stomach
- D. All of the above

Bacterial infection of the stomach or phlegmonous gastritis although rare is a potentially life-threatening disorder characterized by marked & diffuse acute inflammatory infiltrates of entire gastric wall, at times accompanied by necrosis.

215 Which of the following are affected by Phlegmonous gastritis ?

Harrison's 18th Ed. 2457

- A. Elderly individuals
- B. Alcoholics
- C. AIDS patients
- D. All of the above

Elderly individuals, alcoholics, and AIDS patients may be affected by Phlegmonous gastritis.

216 Organism associated with Phlegmonous gastritis is ?

Harrison's 18th Ed. 2457

- A. Staphylococci
- B. Escherichia coli
- C. Haemophilus
- D. All of the above

Organisms associated with Phlegmonous gastritis include streptococci, staphylococci, Escherichia coli, Proteus, and Haemophilus species.

217 The final stage of chronic gastritis is ?

Harrison's 18th Ed. 2458

- A. Superficial gastritis
- B. Atrophic gastritis
- C. Gastric atrophy
- D. Intestinal metaplasia

Early phase of chronic gastritis is superficial gastritis in which inflammatory changes are limited to lamina propria and intact gastric glands. Next stage is atrophic gastritis in which inflammatory infiltrate extends deeper into mucosa, with destruction of gastric glands. Final stage of chronic gastritis is gastric atrophy in which glandular structures are lost, and there is a paucity of inflammatory infiltrates. Endoscopically, mucosa is thin and underlying blood vessels can be visualized. Intestinal metaplasia refers to the conversion of gastric glands to small-bowel mucosal glands containing goblet cells. Intestinal metaplasia is an important predisposing factor for gastric cancer.

218 Antral-predominant form of chronic gastritis is called ?

Harrison's 18th Ed. 2458

- A. Type A gastritis
- B. Type B gastritis
- C. Type AB gastritis
- D. Type O gastritis

Chronic gastritis is also classified according to the predominant site of involvement. Type A refers to fundus and body predominant form, with antral sparing (autoimmune) and type B is the antral-predominant form (*H. pylori*-related). AB gastritis refers to a mixed antral/body picture.

219 Which of the following types of chronic gastritis is associated with pernicious anemia ?

Harrison's 18th Ed. 2458

- A. Type A gastritis
- B. Type B gastritis
- C. Type AB gastritis
- D. Type O gastritis

Type A gastritis, also called autoimmune gastritis is associated with pernicious anemia with circulating antibodies against parietal cells and IF.

220 Parietal cell antibodies are directed against which of the following ?

Harrison's 18th Ed. 2458

- A. Gastrin receptors
- B. Acetylcholine receptors
- C. Histamine receptors
- D. H^+,K^+ -ATPase

Antibodies to parietal cells are detected in >90% of patients with pernicious anemia and in up to 50% of patients with type A gastritis. The parietal cell antibody is directed against H^+,K^+ -ATPase.

221 Varioliform gastritis best relates to ?

Harrison's 18th Ed. 2459

- A. Lymphocytic gastritis
- B. Eosinophilic gastritis
- C. Granulomatous gastritis
- D. Sarcoidosis

A subgroup of patients with lymphocytic gastritis have thickened folds noted on endoscopy. These folds are often capped by small nodules that contain a central depression or erosion; this form of the disease is called varioliform gastritis.

222 Which of the following is false about Ménétrier's disease ?

Harrison's 18th Ed. 2459

- A. Protein-losing gastropathy
- B. Large gastric mucosal folds in body and fundus
- C. Hyperplasia of surface & glandular mucous cells
- D. None of the above

Ménétrier's disease is not considered a form of gastritis. It is characterized by large, tortuous gastric mucosal folds.

223 Large gastric folds can be seen in ?

Harrison's 18th Ed. 2459

- A. ZES
- B. Gastric malignancy
- C. Sarcoidosis
- D. All of the above

224 Which of the following decreases protein loss in Ménétrier's disease ?

Harrison's 18th Ed. 2459

- A. Anticholinergic agents
- B. Prednisone
- C. H_2 receptor antagonists
- D. PPIs

Medical therapy with anticholinergic agents, prostaglandins, PPIs, prednisone, and H_2 receptor antagonists yields varying results. Anticholinergics decrease protein loss.

294 - Disorders of Absorption

225 Intestinal absorption is increased in ?

Harrison's 18th Ed. 2460

- A. Cirrhosis
- B. Jejunal diverticulosis
- C. Hemochromatosis
- D. Crohn's disease

226 Intestinal absorption is increased in ?

Harrison's 18th Ed. 2460

- A. Cirrhosis
- B. Jejunal diverticulosis
- C. Wilson's disease
- D. Crohn's disease

Only clinical malabsorption situations in which absorption is increased are hemochromatosis & Wilson's disease, where absorption of iron and copper is increased respectively.

227 Steatorrhea is defined as an increase in stool fat excretion of how much of dietary fat intake ?

Harrison's 18th Ed. 2460

- A. > 2 %
- B. > 4 %
- C. > 5 %
- D. > 6 %

Most malabsorption syndrome disorders are associated with an increase in stool fat excretion of >6% of dietary fat intake (steatorrhea).

228 Malabsorption disorder not associated with steatorrhea is ?

Harrison's 18th Ed. 2460

- A. Primary lactase deficiency
- B. Celiac sprue
- C. Abetalipoproteinemia
- D. Intestinal lymphangiectasia

229 Malabsorption disorder not associated with steatorrhea is ?

Harrison's 18th Ed. 2460

- A. Tropical sprue
- B. Celiac sprue
- C. Pernicious anemia
- D. Bacterial overgrowth syndrome

Most, but not all, malabsorption syndromes are associated with steatorrhea. Primary lactase deficiency and pernicious anemia are not associated with steatorrhea.

230 In a western-type diet, diarrhea as a sign is a quantitative increase in stool water or weight of ?

Harrison's 18th Ed. 2460

- A. > 100 - 200 gram / day
- B. > 200 - 225 gram / day
- C. > 300 - 425 gram / day
- D. > 400 - 500 gram / day

Diarrhea as a sign is a quantitative increase in stool weight of >200–225 mL gram per day, when a western-type diet is consumed.

231 Which of the following diarrhea would undoubtedly cease during a prolonged fast ?

Harrison's 18th Ed. 2460

- A. Enterotoxin-induced traveler's diarrhea
- B. Primary lactase deficiency
- C. VIPoma
- D. All of the above

Diarrhea secondary to lactose malabsorption in primary lactase deficiency ceases during a prolonged fast.

232 Stool osmolality is ?*Harrison's 18th Ed. 2461*

- A. 250 mosmol/kg H₂O
- B. 275 mosmol/kg H₂O
- C. 300 mosmol/kg H₂O
- D. 325 mosmol/kg H₂O

*Stool osmotic gap = 2 x (stool Na + stool K). Stool osmolality is assumed to be 300 mosmol/kg H₂O.***233 Fecal osmotic gap is calculated as ?***Gastroenterology 1999;116:1461-1463*

- A. 90 - 2([Na⁺] + [K⁺])
- B. 190 - 2([Na⁺] + [K⁺])
- C. 290 - 2([Na⁺] + [K⁺])
- D. 390 - 2([Na⁺] + [K⁺])

*Osmotic diarrheas are characterized by osmotic gaps >125 mOsm/kg (nonelectrolytes account for most of the osmolality of stool water), whereas secretory diarrheas typically have osmotic gaps <50 mOsm/kg (electrolytes account for most of stool osmolality).***234 The lengths of the small intestine and colon are ?***Harrison's 18th Ed. 2461*

- A. ~200 cm and ~50 cm, respectively
- B. ~250 cm and ~70 cm, respectively
- C. ~300 cm and ~80 cm, respectively
- D. ~400 cm and ~100 cm, respectively

*Lengths of small intestine and colon are ~300 cm and ~80 cm respectively.***235 Effective functional surface area of intestines is about how many times greater than that of a hollow tube ?***Harrison's 18th Ed. 2461*

- A. 200 times
- B. 400 times
- C. 600 times
- D. 800 times

*Effective functional surface area is about 600-fold greater than that of a hollow tube due to the presence of folds, villi (in small intestine), and microvilli.***236 Intestinal mucosa synthesizes & secretes which of the following immunoglobulin ?***Harrison's 18th Ed. 2461*

- A. Secretory IgA
- B. Secretory IgG
- C. Secretory IgM
- D. Secretory IgE

*Intestinal mucosa synthesizes and secretes secretory IgA.***237 Daily salivary, gastric, pancreatic, biliary, and intestinal fluid amounts to ?***Harrison's 18th Ed. 2461*

- A. 3 to 4 L/day
- B. 5 to 6 L/day
- C. 6 to 7 L/day
- D. 7 to 8 L/day

*The intestine absorbs ~7 to 8 liters of fluid daily, comprising dietary fluid intake (1 to 2 L/day) and salivary, gastric, pancreatic, biliary, and intestinal fluid (6 to 7 L/day).***238 Which of the following statements is false ?***Harrison's 18th Ed. 2461*

- A. Villi are present in small intestine & colon
- B. Nutrient digestion & absorption occurs in small intestine but not in colon
- C. Digestive hydrolytic enzymes are present in brush border of villus epithelial cells
- D. Secretory function is present in crypts of both small & large intestine

*Villi are present in small intestine but are absent in colon.***239 Na⁺, K⁺ - ATPase in the Na⁺ pump is located on ?***Harrison's 18th Ed. 2461*

- A. Apical membrane
- B. Basolateral membrane
- C. Basomedial membrane
- D. All of the above

*Na⁺ pump is located on the basolateral membrane, which expels Na⁺ and maintains a low intracellular Na⁺ through Na⁺,K⁺ - ATPase.***240 Transport protein SGLT is located on ?***Harrison's 18th Ed. 2461*

- A. Apical membrane
- B. Basolateral membrane
- C. Basomedial membrane
- D. All of the above

*Active glucose (monosaccharide) absorption & glucose-stimulated Na⁺ absorption require both apical membrane transport protein SGLT (sodium/glucose cotransporter) & basolateral Na⁺,K⁺ - ATPase. A competitive inhibitor of SGLT, phlorizin exerts a hypoglycemic effect in diabetics. Gene for SGLT is SLC5A.***241 Which of the following about bile acids is false ?***Harrison's 18th Ed. 2461*

- A. Primary bile acids are synthesized in liver from cholesterol
- B. Secondary bile acids are synthesized from primary bile acids
- C. Cholic & deoxycholic acids are primary bile acids
- D. Lithocholic acid is a secondary bile acid

*Bile acids are not present in the diet but are synthesized in liver. Primary bile acids are synthesized in liver from cholesterol and secondary bile acids are synthesized from primary bile acids in intestine by colonic bacterial enzymes. Primary bile acids are cholic acid & chenodeoxycholic acid. Secondary bile acids are deoxycholic acid and lithocholic acid.***242 What quantity of bile acids are synthesized in liver every day ?***Harrison's 18th Ed. 2461*

- A. 200 mg
- B. 300 mg
- C. 400 mg
- D. 500 mg

*About 500 mg bile acids are synthesized in liver daily, conjugated to either taurine or glycine to form tauro-conjugated or glyco-conjugated bile acids, respectively, and then secreted into duodenum as bile.***243 Primary functions of bile acids is ?***Harrison's 18th Ed. 2461*

- A. To promote bile flow
- B. To solubilize cholesterol & phospholipid in gall bladder
- C. To enhance dietary lipid digestion & absorption

- D. All of the above

Primary functions of bile acids are to promote bile flow, to solubilize cholesterol and phospholipid in gallbladder and to enhance dietary lipid digestion and absorption by forming mixed micelles in proximal small intestine.

244 Bile acids are primarily absorbed “actively” in ?

Harrison's 18th Ed. 2462, Figure 294-1

- A. Duodenum
- B. Jejunum
- C. Ileum
- D. Colon

Bile acids are primarily absorbed by an active, Na⁺-dependent process exclusively in ileum.

245 Secondary bile acids are formed in ?

Harrison's 18th Ed. 2462

- A. Duodenum
- B. Jejunum
- C. Ileum
- D. Colon

Colonic bacterial enzymes dehydroxylate bile acids to secondary bile acids.

246 Bile acid synthesis is autoregulated by ?

Harrison's 18th Ed. 2462

- A. 7 α -hydroxylase
- B. 7 β -hydroxylase
- C. 7 δ -hydroxylase
- D. 7 γ -hydroxylase

Bile acid synthesis is autoregulated by 7 α -hydroxylase, an initial enzyme in cholesterol degradation.

247 The bile acid pool size is approximately ?

Harrison's 18th Ed. 2462, Figure 294-1

- A. 4 grams
- B. 8 grams
- C. 12 grams
- D. 16 grams

248 How many times bile acid pool is circulated via enterohepatic circulation ?

Harrison's 18th Ed. 2462, Figure 294-1

- A. 2 to 4 times / day
- B. 4 to 6 times / day
- C. 6 to 8 times / day
- D. 8 to 12 times / day

Bile acid pool size is ~4 grams and is circulated via the enterohepatic circulation about twice during each meal, or six to eight times daily.

249 Daily bile acids excretion in stool (fecal loss) equals ?

Harrison's 18th Ed. 2462, Figure 294-1

- A. Half of total fat intake
- B. Half of enterohepatic circulation
- C. Hepatic bile acid synthesis
- D. None of the above

A relatively small quantity of bile acids (~500 mg) is not absorbed and is excreted in stool daily; this fecal loss is matched by hepatic bile acid synthesis.

250 Small ileal dysfunction leads to ?

Harrison's 18th Ed. 2462

- A. Bile acid diarrhea
- B. Fatty acid diarrhea
- C. Chloride diarrhea
- D. Protein diarrhea

Due to limited ileal disease or resection increased amount of bile acids are delivered into colon that stimulate active Cl⁻ secretion producing diarrhoea but not steatorrhea because hepatic synthesis of bile acids increases to compensate for the rate of fecal bile acid losses upto a limit. It is called bile acid diarrhea, or cholorrheic enteropathy. It responds promptly to cholestyramine until ileal size is severely reduced.

251 Large ileal dysfunction leads to ?

Harrison's 18th Ed. 2462

- A. Bile acid diarrhea
- B. Fatty acid diarrhea
- C. Carbohydrate diarrhea
- D. Protein diarrhea

Patients with greater degrees of ileal disease and/or resection have diarrhea & steatorrhea that do not respond to cholestyramine. Increased quantities of bile acids enter colon. Hepatic synthesis proves insufficient resulting in impaired micelle formation and steatorrhea. This is called fatty acid diarrhea. Low-fat diet can be effective.

252 Reabsorption defect in enterohepatic circulation of bile acids is due to ?

Harrison's 18th Ed. 2463

- A. Cirrhosis
- B. Primary biliary cirrhosis
- C. Jejunal diverticulosis
- D. Crohn's disease

Ileal dysfunction caused by Crohn's disease results in a decrease in bile acid reabsorption in ileum and an increase in the delivery of bile acids to large intestine leading to diarrhea with or without steatorrhea.

253 Which of the following is not a feature of bile acid diarrhea ?

Harrison's 18th Ed. 2463, Table 294-2

- A. Normal bile acid pool size
- B. None or mild steatorrhea
- C. Responds to cholestyramine
- D. Responds to low-fat diet

Features of bile acid diarrhea are - extent of ileal disease is limited, ileal bile acid absorption is reduced, fecal bile acid excretion is increased, fecal bile acid loss is compensated by hepatic synthesis, bile acid pool size is normal, steatorrhea is absent or mild, response obtained with cholestyramine & no response to low-fat diet.

254 Which of the following is not a feature of fatty acid diarrhea ?

Harrison's 18th Ed. 2463, Table 294-2

- A. Reduced bile acid pool size
- B. Steatorrhea
- C. Responds to cholestyramine
- D. Responds to low-fat diet

Features of fatty acid diarrhea are extensive ileal disease, ileal bile acid absorption reduced, fecal bile acid excretion increased, fecal bile acid loss is not compensated by hepatic synthesis, bile acid pool size is reduced, steatorrhea (>20 grams) that does not respond to cholestyramine but responds to a low-fat diet.

255 Which of the following type of fatty acids compose dietary fats ?

Harrison's 18th Ed. 2463

- A. Long-chain fatty acids (LCFAs)
- B. Medium-chain fatty acids (MCFAs)

- C. Short-chain fatty acids (SCFAs)
- D. All of the above

Three types of fatty acids compose fats: long-chain fatty acids (LCFAs), medium-chain fatty acids (MCFAs), and short-chain fatty acids (SCFAs).

256 Dietary fat is in the form of ?

Harrison's 18th Ed. 2463

- A. Long-chain triglycerides (LCTs)
- B. Medium-chain fatty acids (MCFAs)
- C. Short-chain fatty acids (SCFAs)
- D. All of the above

Dietary fat is exclusively composed of long-chain triglycerides (LCTs), i.e., glycerol that is bound via ester-linkages to three LCFAs.

257 Majority of dietary long chain fatty acids (LCFAs) have carbon chain lengths of ?

Harrison's 18th Ed. 2463, Table 294-3

- A. 6 - 8
- B. 8 - 10
- C. 10 - 12
- D. > 12

3 types of fatty acids compose fats - long chain fatty acids (LCFAs), medium-chain fatty acids (MCFAs) & short-chain fatty acids (SCFAs). Majority of dietary LCFAs have carbon chain lengths of 16 or 18.

258 Dietary MCFAs have carbon chain lengths of ?

Harrison's 18th Ed. 2463, Table 294-3

- A. 6 - 8
- B. 8 - 12
- C. 12 - 16
- D. 16 - 20

Medium-chain triglycerides (MCTs) or medium-chain fatty acids, composed of fatty acids with carbon chain lengths of 8 to 10, are present in large amounts in coconut oil.

259 Steatorrhea results due to defect in which phase of dietary lipid assimilation ?

Harrison's 18th Ed. 2463

- A. Intraluminal or digestive phase
- B. Mucosal or absorptive phase
- C. Delivery or postabsorptive phase
- D. Any of the above

Assimilation of dietary lipid occurs in intraluminal or digestive phase, mucosal or absorptive phase and delivery or postabsorptive phase. An abnormality at any site of this process can cause steatorrhea.

260 "Micellar formation" belongs to which phase of dietary lipid assimilation ?

Harrison's 18th Ed. 2463

- A. Intraluminal or digestive phase
- B. Mucosal or absorptive phase
- C. Delivery or postabsorptive phase
- D. Any of the above

The digestive phase has two components, lipolysis and micellar formation.

261 Lipolysis is initiated in ?

Harrison's 18th Ed. 2463

- A. Stomach

- B. Duodenum
- C. Jejunum
- D. Ilium

262 In lipolysis, hydrolysis of triglycerides by lipase leads to the formation of ?

Harrison's 18th Ed. 2463

- A. Free fatty acids
- B. Monoglycerides
- C. Glycerol
- D. All of the above

Lipolysis i.e. hydrolysis of Tg to free fatty acids, monoglycerides & glycerol by lipase is "initiated" in stomach by gastric lipase. ~20 - 30% of total lipolysis occurs in stomach.

263 Pancreatic lipolysis is greatly enhanced by ?

Harrison's 18th Ed. 2463

- A. Gastric lipase
- B. Pancreatic lipase
- C. Colipase
- D. All of the above

Pancreatic lipolysis is greatly enhanced by the presence of pancreatic enzyme, colipase, which facilitates the movement of lipase to triglyceride.

264 Normal lipolysis can be maintained by what percentage of maximal pancreatic lipase secretion ?

Harrison's 18th Ed. 2464

- A. 5 %
- B. 15 %
- C. 25 %
- D. 35 %

Normal lipolysis can be maintained by ~5% of maximal pancreatic lipase secretion.

265 Pancreatic lipase is inactivated at ?

Harrison's 18th Ed. 2464

- A. pH < 7
- B. pH < 7.5
- C. pH < 8
- D. pH < 8.5

Lipolysis is completed in the duodenum and jejunum by pancreatic lipase, which is inactivated by pH <7.0 leading to altered lipolysis.

266 Mixed micelles are molecular aggregates composed of all except ?

Harrison's 18th Ed. 2464

- A. Fatty acids
- B. Triglycerides
- C. Cholesterol
- D. Conjugated bile acids

Mixed micelles are molecular aggregates composed of fatty acids, monoglycerides, phospholipids, cholesterol, and conjugated bile acids.

267 Which of the following relates best with absorptive phase of lipid digestion-absorption ?

Harrison's 18th Ed. 2464

- A. Micellar formation
- B. Uptake and reesterification
- C. Formation of chylomicrons

- D. Colonic bacterial enzymes

Uptake and reesterification constitute the absorptive phase of lipid digestion-absorption.

268 In which form lipids exit from intestinal epithelial cell ?

Harrison's 18th Ed. 2464

- A. Free fatty acids
- B. Reesterified triglyceride
- C. Cholesterol
- D. Monoglyceride

Fatty acids and monoglycerides are reesterified by a series of enzymatic steps in the endoplasmic reticulum to form triglycerides, the form in which lipid exits from the intestinal epithelial cell. Reesterified triglycerides require formation of chylomicrons for their exit from small-intestinal epithelial cell & their delivery to liver via lymphatics.

269 Chylomicrons are composed of ?

Harrison's 18th Ed. 2464

- A. α -lipoprotein
- B. β -lipoprotein
- C. δ -lipoprotein
- D. γ -lipoprotein

270 Chylomicrons contain ?

Harrison's 18th Ed. 2464

- A. Triglyceride
- B. Cholesterol and Cholesterol ester
- C. Phospholipid
- D. All of the above

271 Reesterified triglyceride exit from intestinal epithelial cell into ?

Harrison's 18th Ed. 2464

- A. Lymphatics
- B. Portal vein
- C. Systemic vein
- D. All of the above

Chylomicrons are composed of beta-lipoprotein and contain triglycerides, cholesterol, cholesterol esters, and phospholipids and enter the lymphatics, not the portal vein.

272 In abetalipoproteinemia, the defect is in ?

Harrison's 18th Ed. 2464

- A. Lipolysis
- B. Micelle formation
- C. Lipid uptake
- D. Reesterified triglyceride exit from epithelial cell

Abetalipoproteinemia, or acanthocytosis is a disorder of impaired synthesis of beta-lipoprotein. Lipolysis, micelle formation, and lipid uptake are all normal in patients, but reesterified triglyceride cannot exit from intestinal epithelial cell because of the failure to produce chylomicrons.

273 Coconut oil contains mainly ?

Harrison's 18th Ed. 2464

- A. Long-chain triglycerides (LCTs)
- B. Medium-chain triglycerides (MCT)
- C. Short-chain fatty acids (SCFA)
- D. All of the above

Medium-chain triglycerides (MCTs), composed of fatty acids with carbon chain lengths of 8 to 10, are present in large amounts in coconut oil and are used as a nutritional supplement.

274 Which of the following statements about Medium-chain triglycerides (MCTs) is false ?

Harrison's 18th Ed. 2464

- A. Do not require pancreatic lipolysis
- B. Micelle formation is not necessary for absorption
- C. Following absorption, not reesterified
- D. Route of exit is via lymphatics

Unlike LCTs, MCTs do not require pancreatic lipolysis as Tg can be absorbed intact by intestinal epithelial cell & micelle formation is not necessary for absorption of MCTs, following absorption are not reesterified, do not require chylomicron formation for their exit from intestinal epithelial cells, & their route of exit is via portal vein & not via lymphatics.

275 The SCFA present in stool is ?

Harrison's 18th Ed. 2465

- A. Acetate
- B. Propionate
- C. Butyrate
- D. All of the above

The SCFAs present in stool are primarily acetate, propionate, and butyrate, whose carbon chain lengths are 2, 3, and 4, respectively.

276 The primary nutrient for colonic epithelial cells is ?

Harrison's 18th Ed. 2465

- A. Acetate
- B. Propionate
- C. Butyrate
- D. All of the above

Butyrate is the primary nutrient for colonic epithelial cells & its deficiency may be associated with colitis.

277 Which of the following statements about SCFAs is false ?

Harrison's 18th Ed. 2465

- A. SCFAs are dietary lipids
- B. Synthesized by colonic bacterial enzymes from nonabsorbed carbohydrate
- C. SCFAs in stool are acetate, propionate, & butyrate
- D. SCFAs are rapidly absorbed & stimulate colonic Na-Cl & fluid absorption

SCFAs are not dietary lipids but are synthesized by colonic bacterial enzymes from nonabsorbed carbohydrate. SCFAs present in stool are primarily acetate, propionate, and butyrate. SCFAs are rapidly absorbed and stimulate colonic Na-Cl and fluid absorption.

278 Carbohydrates in the diet are present in the form of ?

Harrison's 18th Ed. 2465

- A. Starch
- B. Disaccharides (sucrose and lactose)
- C. Glucose
- D. All of the above

Carbohydrates in the diet are present in the form of starch, disaccharides (sucrose and lactose), and glucose.

279 Which of the following statements about carbohydrates is false ?

Harrison's 18th Ed. 2465

- A. Absorbed only in the small intestine
- B. Absorbed only in the form of monosaccharides
- C. Absorption occurs by a Na-dependent process
- D. None of the above

280 Transport protein that mediates monosaccharide absorption is ?

Harrison's 18th Ed. 2465

- A. AGLT
- B. MGLT
- C. SGLT
- D. TGLT

Carbohydrates are absorbed only in the small intestine and only in the form of monosaccharides whose absorption occurs by a Na-dependent process mediated by the brush border transport protein SGLT1.

281 Which of the following about lactose malabsorption is false ?

Harrison's 18th Ed. 2465

- A. Glucose and galactose are constituents of lactose
- B. Primary lactase deficiency patients have severe symptoms
- C. Secondary lactase deficiency is seen in celiac sprue
- D. Symptoms may be similar to IBS

Most individuals with primary lactase deficiency do not have symptoms.

282 Congenital absence of SGLT leads to ?

Harrison's 18th Ed. 2465

- A. Glucose, galactose malabsorption
- B. Lactose malabsorption
- C. Maltose malabsorption
- D. Sucrose malabsorption

Congenital absence of SGLT leads to glucose-galactose or monosaccharide malabsorption diarrhea.

283 Which of the following carbohydrate is absorbed by brush border transport protein - GLUT 5 ?

Harrison's 18th Ed. 2466

- A. Glucose
- B. Galactose
- C. Fructose
- D. Sorbitol

Fructose is absorbed by the brush border transport protein GLUT 5, a facilitated diffusion process that is not Na-dependent and is distinct from SGLT.

284 Actively transported monosaccharides are all except ?

Harrison's 18th Ed. 2466

- A. Glucose
- B. Galactose
- C. Fructose
- D. All of the above

Actively transported monosaccharides are glucose and galactose.

285 Sugar used in diabetic candy is ?

Harrison's 18th Ed. 2466

- A. Sorbitol
- B. Galactose
- C. Fructose
- D. None of the above

Sugar used in diabetic candy is sorbitol which is only minimally absorbed due to absence of an intestinal absorptive transport mechanism for sorbitol.

286 What value of stool pH is consistent with carbohydrate malabsorption ?

Gastroenterology 1999;116:1461-1463

- A. < 5.6
- B. < 6.6
- C. < 7.6
- D. < 8.6

Stool pH <5.6 is consistent with carbohydrate malabsorption.

287 Protein is present in food almost exclusively as ?

Harrison's 18th Ed. 2466

- A. Polypeptides
- B. Dipeptides
- C. Tripeptides
- D. Amino acids

Protein is present in food almost exclusively as polypeptides and requires extensive hydrolysis to di- and tripeptides and amino acids before absorption.

288 Brush border enzyme that converts the proenzyme trypsinogen to trypsin is ?

Harrison's 18th Ed. 2466

- A. Enterokinase
- B. Colipase
- C. Pepsinogen
- D. Amylase

Proenzyme trypsinogen is activated to trypsin by the intestinal brush border enzyme enterokinase, and subsequently by trypsin.

289 Alterations in protein or amino acid digestion and absorption is seen in which of the following ?

Harrison's 18th Ed. 2466

- A. Enterokinase deficiency
- B. Hartnup syndrome
- C. Cystinuria
- D. All of the above

Enterokinase deficiency leads to failure to convert proenzyme trypsinogen to trypsin and is manifested as diarrhea, growth retardation and hypoproteinemia. Hartnup syndrome, a defect in neutral amino acid transport, is characterized by a pellagra-like rash and neuropsychiatric symptoms. Cystinuria, a defect in dibasic amino acid transport, is associated with renal calculi and chronic pancreatitis.

290 C. difficile accounts for what percentage of all antibiotic-associated diarrhea ?

Harrison's 17th Ed. 1876

- A. ~ 10 - 15 %
- B. ~ 25 - 40 %
- C. ~ 40 - 75 %
- D. ~ 75 - 95 %

C. difficile accounts for ~10 - 15 % of all antibiotic-associated diarrhea.

291 The proximal small intestine is the site for the absorption of all of the following except ?

Harrison's 18th Ed. 2466

- A. Calcium
- B. Iron
- C. Folic acid
- D. Bile acids

Calcium, iron and folic acid are exclusively absorbed by active transport processes in proximal small intestine especially the duodenum.

292 Ileum is the absorption site of all of the following except ?

Harrison's 18th Ed. 2466

- A. Cobalamin
- B. Bile acids
- C. Calcium
- D. None of the above

Active transport mechanisms for cobalamin & bile acids are present only in ileum.

293 Glucose, amino acids and lipids are absorbed in ?

Harrison's 18th Ed. 2466

- A. Duodenum
- B. Jejunum
- C. Ileum
- D. Throughout the small intestine

Glucose, amino acids & lipids are absorbed throughout the small intestine.

294 Schilling test is performed to determine the cause for ?

Harrison's 18th Ed. Chapter e37

- A. Cobalamin malabsorption
- B. Folic acid malabsorption
- C. Iron malabsorption
- D. All of the above

Schilling test is performed to determine the cause for cobalamin malabsorption.

295 Cobalamin is present primarily in ?

Harrison's 18th Ed. Chapter e37

- A. Fruits
- B. Green vegetables
- C. Meat
- D. Egg

Cobalamin is present primarily in meat.

296 R-binder protein is synthesized in ?

Harrison's 18th Ed. Chapter e37

- A. Salivary glands
- B. Jejunum
- C. Pancreas
- D. Ileum

297 R-binder protein is synthesized in ?

Harrison's 18th Ed. Chapter e37

- A. Stomach
- B. Jejunum
- C. Pancreas
- D. Ileum

Dietary cobalamin is bound in stomach to a glycoprotein called R-binder protein, which is synthesized in stomach and salivary glands.

298 Intrinsic factor is synthesized and released by ?

Harrison's 18th Ed. Chapter e37

- A. Gastric parietal cells
- B. Gastric oxyntic cells

C. Gastric chief cells

D. Gastric G cells

Intrinsic factor (IF) is absolutely required for the absorption of cobalamin. IF is a glycoprotein synthesized & released by gastric parietal cells, to promote its uptake by specific cobalamin receptors on the brush border of ileal enterocytes. Pancreatic protease enzymes split the cobalamin-R binder complex to release cobalamin in proximal small intestine, where cobalamin is then bound by intrinsic factor (IF).

299 Cobalamin absorption may be abnormal in which of the following ?

Harrison's 18th Ed. Chapter e37

- A. Pernicious anemia
- B. Chronic pancreatitis
- C. Bacterial overgrowth syndromes
- D. All of the above

Cobalamin absorption may be abnormal in Pernicious anemia, Chronic pancreatitis, Achlorhydria, Bacterial overgrowth syndromes, and Ileal dysfunction.

300 Which isotope is used in Schilling test ?

Harrison's 18th Ed. Chapter e37

- A. ^{58}Co -labeled cobalamin
- B. ^{68}Co -labeled cobalamin
- C. ^{78}Co -labeled cobalamin
- D. ^{88}Co -labeled cobalamin

Schilling test is performed by administering ^{58}Co -labeled cobalamin orally and collecting urine for 24 hours. It is dependent on normal renal and bladder function.

301 The Schilling test is termed abnormal if oral ^{58}Co -labeled cobalamin excretion in urine is ?

Harrison's 18th Ed. Chapter e37

- A. <10% in 24 hours
- B. <15% in 24 hours
- C. <20% in 24 hours
- D. <20% in 24 hours

Schilling test is termed abnormal if oral ^{58}Co -labeled cobalamin excretion in urine is <10% in 24 hours.

302 Abnormal Schilling test may be found in all except ?

Harrison's 18th Ed. Chapter e37

- A. Pernicious anemia
- B. Chronic pancreatitis
- C. Blind loop syndrome
- D. Cirrhosis of liver

Schilling test is abnormal in pernicious anemia, chronic pancreatitis, blind loop syndrome & ileal disease.

303 ^{58}Co -cobalamin excretion is reduced with intrinsic factor, with pancreatic enzymes, and after 5 days of antibiotics in ?

Harrison's 18th Ed. Chapter e37, Table e37-1

- A. Pernicious anemia
- B. Chronic pancreatitis
- C. Blind loop syndrome
- D. Ileal disease

304 Which of the following is false about urinary D-xylose test ?

Harrison's 18th Ed. 2467

- A. Assesses proximal small-intestinal mucosal function
- B. D-Xylose is a pentose carbohydrate

- C. 25 gm of D-xylose & collecting urine for 5 hours
- D. < 12 gm excretion means an abnormal test

Urinary D-xylose test (<4.5 gram excretion) reflects presence of duodenal / jejunal mucosal disease.

305 Urinary D-xylose test can be false-positive in ?

Harrison's 18th Ed. 2467

- A. Head injury
- B. Myocardial infarction
- C. Ascitis
- D. Pneumonia

Urinary D-xylose test is false-positive in large fluid collections in third space (ascites, pleural fluid).

306 Bentiromide test is used for ?

Harrison's 16th Ed. 1770

- A. Pancreatic exocrine function
- B. Pancreatic endocrine function
- C. Pancreatic neural function
- D. All of the above

307 Which of the following is used in Bentiromide test ?

Harrison's 16th Ed. 1770

- A. D-Xylose
- B. GABA
- C. PABA
- D. All of the above

308 Synonym of Celiac sprue is ?

Harrison's 18th Ed. 2469

- A. Nontropical sprue
- B. Celiac disease
- C. Gluten sensitive enteropathy
- D. All of the above

Celiac sprue has also been known as nontropical sprue, celiac disease (in children), adult celiac disease, and gluten sensitive enteropathy.

309 Which of the following about Celiac disease is false ?

N Engl J Med 2012;367:2419-26

- A. Systemic disorder
- B. Immune-mediated disorder
- C. Triggered by dietary gluten
- D. None of the above

Celiac disease is a systemic immune-mediated disorder triggered by dietary gluten in genetically susceptible persons.

310 The word "sprue" comes from which language ?

N Engl J Med 2007;357:1731-43

- A. Dutch
- B. Latin
- C. Greek
- D. English

311 Which of the following respond to elimination of gluten from the diet in celiac sprue ?

Harrison's 18th Ed. 2470

- A. Symptoms

- B. Evidence of malabsorption
- C. Histopathologic changes in small-intestinal biopsy
- D. All of the above

In celiac sprue, symptoms, evidence of malabsorption and histopathologic changes on small-intestinal biopsy respond to elimination of gluten from diet.

312 Gliadin (a component of gluten) is present in all except ?

Harrison's 18th Ed. 2470

- A. Wheat
- B. Barley
- C. Rice
- D. Oats

Gluten is a protein complex. Gliadin is a component of gluten present in wheat, barley, rye & in smaller amounts in oats. Antidendymyal antibody tTG deaminates gliadin.

313 Which of the following is considered as "safe grains" (gluten-free) ?

N Engl J Med 2007;357:1731-43

- A. Rice
- B. Corn
- C. Millet
- D. All of the above

Safe grains (gluten-free) include rice, amaranth, buckwheat, corn, millet, quinoa, sorghum, teff (an Ethiopian cereal grain), & oats.

314 Gliadin is which component of gluten ?

N Engl J Med 2007;357:1731-43

- A. Heat resistant fraction
- B. Alcohol-soluble fraction
- C. Water soluble fraction
- D. Contaminated fraction

"Gluten" refers to the entire protein component of wheat. Gliadin is the alcohol-soluble fraction of gluten that contains bulk of toxic components.

315 Which of the following enzyme in intestine deamidates gliadin peptides ?

N Engl J Med 2007;357:1731-43

- A. Tissue transaminase
- B. Tissue transmurase
- C. Tissue transglutaminase
- D. Tissue transpeptidase

Enzyme tissue transglutaminase in intestine deamidates gliadin peptides increasing their immunogenicity.

316 The most sensitive antibody tests for the diagnosis of celiac disease are of which class ?

N Engl J Med 2007;357:1731-43

- A. IgA
- B. IgG
- C. IgM
- D. IgE

Most sensitive antibody tests for diagnosis of celiac disease are of IgA class.

317 Serum antibodies found in celiac sprue include all except ?

Harrison's 18th Ed. 2470

- A. IgA antigliadin

- B. IgA antiendomysial antibodies
- C. IgA anti-tissue transglutaminase
- D. IgA anti-tissue transpeptidase

"Celiac serologies" in celiac sprue include serum antibodies like IgA anti gliadin, IgA antiendomysial and IgA anti-tTG antibodies are present suggesting an immunologic component to etiology.

318 Antiendomysial antibodies are directed against ?

N Engl J Med 2007;357:1731-43

- A. Epithelial tissue
- B. Enzyme
- C. Connective-tissue
- D. All of the above

Serological tests in celiac disease include anti gliadin antibodies, connective-tissue antibodies (antireticulin & antiendomysial antibodies), & antibodies against tissue transglutaminase, enzyme responsible for deamidation of gliadin in lamina propria.

319 Antigen recognized by the antiendomysial antibody test is ?

Harrison's 18th Ed. 2470

- A. Tissue transaminase
- B. Tissue transmurase
- C. Tissue transglutaminase
- D. Tissue transpeptidase

In celiac sprue, antigen recognized by antiendomysial antibody test is tissue transglutaminase (tTG).

320 Negative predictive value of which of the following HLA allele is almost 100% in celiac sprue ?

N Engl J Med 2007;357:1731-43, Harrison's 18th Ed. 2470

- A. HLA-DQ2
- B. HLA-DQ3
- C. HLA-DQ4
- D. HLA-DQ5

In patients with doubtful celiac sprue, HLA-DQ2 or HLA-DQ8 typing is useful, since negative predictive value of this test is almost 100%. Almost all patients with celiac sprue express HLA-DQ2 allele. Absence of DQ2 excludes the diagnosis of celiac sprue. All patients with celiac disease express the HLA-DQ2 or HLA-DQ8 allele.

321 The HLA-DQ2 haplotype (DQA1*0501/DQB1*0201) is expressed in what proportion of the general population ?

N Engl J Med 2012;367:2419-26

- A. One third
- B. One half
- C. Three fourth
- D. None

The HLA-DQ2 haplotype (DQA1*0501/DQB1*0201) is expressed in the majority of patients with celiac disease (90%), whereas it is expressed in one third of the general population. In another 5% of patients with celiac disease, the HLA-DQ8 haplotype (DQA1*0301/DQB1*0302) is expressed, whereas almost all the remaining 5% of patients have at least one of the two genes encoding DQ2 (DQB1*0201 or DQA1*0501). DQ2 & DQ8 haplotypes are necessary but not sufficient for the development of celiac disease. At least 39 non-HLA genes that predispose to celiac disease have been identified, mostly involved in inflammatory and immune responses.

322 Which of the following tests have a high negative predictive value in the diagnosis of celiac disease ?

N Engl J Med 2012;367:2419-26, Harrison's 18th Ed. 2470

- A. IgA anti-tTG antibodies
- B. IgG anti-tTG antibodies
- C. IgA antiendomysial antibodies

- D. HLA-DQ2 or HLA-DQ8

Testing for HLA-DQ2 and HLA-DQ8 may be useful in at-risk persons (e.g., family members of patients with celiac disease). Such testing has a high negative predictive value, which means that the disease is very unlikely to develop in persons who are negative for both HLA-DQ2 and HLA-DQ8. Absence of HLA DQ2/DQ8 excludes the diagnosis of celiac disease.

323 Which of the following tests have usefulness in patients with IgA deficiency ?

N Engl J Med 2012;367:2419-26

- A. IgA anti-tTG antibodies
- B. IgG anti-tTG antibodies
- C. IgA antiendomysial antibodies
- D. HLA-DQ2 or HLA-DQ8

324 Which of the following tests have usefulness in patients with an uncertain diagnosis ?

N Engl J Med 2012;367:2419-26

- A. IgA anti-tTG antibodies
- B. IgG anti-tTG antibodies
- C. IgA antiendomysial antibodies
- D. HLA-DQ2 or HLA-DQ8

325 Which of the following is false about duodenal/jejunal biopsy histopathology in celiac sprue ?

Harrison's 18th Ed. 2470

- A. Reduced height of villi
- B. Crypt hyperplasia
- C. Increased lymphocytes & plasma cells in lamina propria
- D. None of the above

A small-intestinal biopsy is required to establish a diagnosis of celiac disease. In celiac sprue, changes seen on duodenal/jejunal biopsy are restricted to mucosa and include absence or reduced height of villi (flat appearance), crypt hyperplasia and villus atrophy and increased lymphocytes and plasma cells in the lamina propria.

326 Histopathologic features characteristic of celiac sprue can also be seen in all except ?

Harrison's 18th Ed. 2471

- A. Tropical sprue
- B. Ulcerative colitis
- C. Milk-protein intolerance in children
- D. Eosinophilic enteritis

327 Histopathologic features characteristic of celiac sprue can also be seen in all except ?

Harrison's 18th Ed. 2471

- A. Lymphoma
- B. Intestinal lymphangiectasis
- C. Crohn's disease
- D. Gastrinoma with acid hypersecretion

Histopathologic features of celiac sprue is seen in tropical sprue, eosinophilic enteritis & milk-protein intolerance in children, lymphoma, bacterial overgrowth, Crohn's disease & gastrinoma with acid hypersecretion.

328 Which of the following about "Celiac crisis" is false ?

N Engl J Med 2012;367:2419-26

- A. Mostly observed in adults
- B. Severe diarrhea
- C. Hypoproteinemia

- D. Metabolic and electrolyte imbalances

Celiac crisis is a rare life-threatening syndrome, mostly observed in children, characterized by severe diarrhea, hypoproteinemia, and metabolic and electrolyte imbalances.

329 After how many months of a strict gluten free diet, celiac disease is termed refractory ?

N Engl J Med 2012;367:2419-26

- A. 3 months
- B. 6 months
- C. 9 months
- D. 12 months

Refractory celiac disease is diagnosed when there are persistent or recurrent malabsorptive symptoms and signs with villous atrophy detected on biopsy despite maintenance of a strict gluten free diet for more than 12 months.

330 Which of the following is true for refractory celiac disease type 2 ?

N Engl J Med 2012;367:2419-26

- A. Abnormal intraepithelial lymphocytes
- B. Clonal intraepithelial lymphocytes without CD3
- C. Clonal intraepithelial lymphocytes without CD8
- D. All of the above

Refractory celiac disease can be classified as type 1 (normal intraepithelial lymphocytes) or type 2 (abnormal intraepithelial lymphocytes; clonal intraepithelial lymphocytes lacking surface markers CD3, CD8, and T-cell receptors; or both). Type 2 is associated with a higher risk of ulcerative jejunoileitis and lymphoma than type 1.

331 In celiac disease, the lowest amount of daily gluten that causes damage to celiac intestinal mucosa over time (gluten threshold) is ?

N Engl J Med 2012;367:2419-26

- A. 1 to 5 mg per day
- B. 10 to 50 mg per day
- C. 100 to 500 mg per day
- D. 1000 to 2500 mg per day

In celiac disease, the lowest amount of daily gluten that causes damage to celiac intestinal mucosa over time (gluten threshold) is 10 to 50 mg per day (a 25 gram slice of bread contains ~1.6 grams of gluten). New Codex Alimentarius regulation permits a maximum gluten contamination of 20 ppm in glutenfree products.

332 Interval between exposure to gluten and onset of symptoms in Celiac disease is ?

N Engl J Med 2012;367:2419-26

- A. Minutes to hours
- B. Hours to days
- C. Weeks to years
- D. Any of the above

333 Interval between exposure to gluten and onset of symptoms in Wheat allergy is ?

N Engl J Med 2012;367:2419-26

- A. Minutes to hours
- B. Hours to days
- C. Weeks to years
- D. Any of the above

334 Interval between exposure to gluten and onset of symptoms in Gluten sensitivity is ?

N Engl J Med 2012;367:2419-26

- A. Minutes to hours

- B. Hours to days
- C. Weeks to years
- D. Any of the above

335 Mechanism of diarrhea in celiac disease is ?

Harrison's 18th Ed. 2471

- A. Steatorrhea
- B. Secondary lactase deficiency
- C. Bile acid malabsorption
- D. All of the above

The diarrhea in celiac disease may be secondary to steatorrhea (due to changes in jejunal mucosal function), secondary lactase deficiency (due to changes in jejunal brush border enzymatic function), bile acid malabsorption (due to bile acid-induced fluid secretion in the colon, and endogenous fluid secretion resulting from crypt hyperplasia).

336 The diarrhea in celiac sprue is due to all except ?

Harrison's 18th Ed. 2471

- A. Steatorrhea
- B. Lipase deficiency
- C. Bile acid malabsorption
- D. Endogenous fluid secretion

Diarrhea in celiac sprue may be secondary to steatorrhea, secondary lactase deficiency, bile acid malabsorption and endogenous fluid secretion.

337 Celiac sprue may be associated with following diseases except ?

Harrison's 18th Ed. 2471, N Engl J Med 2002;346:181

- A. Dermatitis herpetiformis (DH)
- B. Type 1 diabetes mellitus
- C. IgA deficiency
- D. Chronic pancreatitis

Celiac disease is associated with dermatitis herpetiformis (DH), diabetes mellitus type 1, IgA deficiency, Down syndrome, Turner's syndrome, Autoimmune thyroid disease, Sjögren's syndrome, Microscopic colitis, Rheumatoid arthritis.

338 Prevalence of celiac disease is increased in which of the following conditions ?

N Engl J Med 2012;367:2419-26

- A. Hashimoto's thyroiditis
- B. Turner's syndrome
- C. IgA deficiency
- D. All of the above

Prevalence of celiac disease is 1.5 to 2 times as high among women as among men and is increased among persons who have an affected first-degree relative (10 to 15%), type 1 diabetes (3 to 16%), Hashimoto's thyroiditis (5%) or other autoimmune diseases (including autoimmune liver diseases, Sjögren's syndrome, and IgA nephropathy), Down's syndrome (5%), Turner's syndrome (3%), and IgA deficiency (9%).

339 Complications of Celiac sprue include all except ?

Harrison's 18th Ed. 2471

- A. Malignancy
- B. Intestinal ulceration
- C. Collagenous sprue
- D. Fistulas

Complications of celiac sprue include gastrointestinal and nongastrointestinal neoplasms, intestinal ulceration and collagenous sprue.

340 Complications associated with untreated celiac disease include ?

Harrison's 18th Ed. 2471, N Engl J Med 2012;367:2419-26

- A. Infertility or recurrent abortion

- B. Impaired splenic function
- C. Neurologic disorders
- D. All of the above

Complications associated with untreated celiac disease include osteoporosis, impaired splenic function, neurologic disorders, infertility or recurrent abortion, ulcerative jejunoileitis, and cancer. Enteropathy-associated T-cell lymphoma and adenocarcinoma of the jejunum are rare complications of celiac disease.

341 Endocrine and metabolic disorders that can cause malabsorption syndrome include ?

Harrison's 18th Ed. 2475, Table 294-8

- A. Hypoparathyroidism
- B. Hyperthyroidism
- C. Carcinoid syndrome
- D. All of the above

Endocrine & metabolic disorders that can cause malabsorption syndrome include diabetes, hypoparathyroidism, adrenal insufficiency, hyperthyroidism & carcinoid syndrome.

342 Circulatory disorders that can cause malabsorption syndrome include ?

Harrison's 18th Ed. 2475, Table 294-8

- A. Congestive heart failure
- B. Constrictive pericarditis
- C. Mesenteric artery atherosclerosis
- D. All of the above

343 Dermatitis in malabsorption syndrome is due to deficiency of ?

Harrison's 18th Ed. 2476, Table 294-9

- A. Vitamin A
- B. Zinc
- C. Essential fatty acid
- D. All of the above

344 Glossitis, cheilosis, stomatitis in malabsorption syndrome is due to deficiency of ?

Harrison's 18th Ed. 2476, Table 294-9

- A. Iron
- B. Vitamin B12, folate
- C. Vitamin A
- D. All of the above

345 Chronic diarrhea in a tropical environment is most often caused by all except ?

Harrison's 18th Ed. 2471

- A. Yersinia enterocolitica
- B. Cryptosporidium parvum
- C. Giardia lamblia
- D. Entamoeba histolytica

Chronic diarrhea in a tropical environment is most often caused by G. lamblia, Yersinia enterocolitica, C. difficile, Cryptosporidium parvum and Cyclospora cayetanensis.

346 Patients of Tropical sprue are rarely found in ?

Harrison's 18th Ed. 2472

- A. South India
- B. Philippines
- C. Caribbean islands
- D. Africa

Tropical sprue is found in South India, Philippines and Caribbean islands, but is rarely observed in Africa, Jamaica, or Southeast Asia.

347 Treatment of Tropical sprue includes ?

Harrison's 18th Ed. 2472

- A. Gluten-free diet
- B. Broad-spectrum antibiotics
- C. Glucocorticoids
- D. All of the above

Broad-spectrum antibiotics and folic acid are curative in tropical sprue.

348 Diseases that may arise following small-intestinal resection include all except ?

Harrison's 18th Ed. 2472

- A. Colonic diverticulosis
- B. Cholesterol gall stones
- C. Gastric hypersecretion of acid
- D. Hyperoxaluria

Following large resections of small intestine, enteric hyperoxaluria, cholesterol gallstones and gastric hypersecretion of acid occurs.

349 Enteric hyperoxaluria is best treated with ?

Harrison's 18th Ed. 2472

- A. Allopurinol
- B. Aspirin
- C. Codeine
- D. Cholestyramine

Cholestyramine, an anion-binding resin & calcium are useful in reducing hyperoxaluria.

350 Which of the following hormones has a role in the treatment of short bowel syndrome ?

Harrison's 18th Ed. 2473

- A. Glucagon-like peptide 2 (GLP-2)
- B. VIP
- C. Cholecystokinin
- D. TSH

Potential effectiveness of hormones like glucagon-like peptide-2 (GLP-2), epidermal growth factor (EGF) & growth hormone (GH) is being studied in short bowel syndrome.

351 Stagnant bowel or blind loop syndrome refers to ?

Harrison's 18th Ed. 2473

- A. Stasis due to impaired peristalsis
- B. Changes in intestinal anatomy
- C. Direct communication between small & large intestine
- D. All of the above

Bacterial proliferation in bacterial overgrowth syndrome or stagnant bowel syndrome or blind loop syndrome is due to stasis caused by impaired peristalsis (functional stasis), changes in intestinal anatomy (anatomic stasis) or direct communication between small and large intestine.

352 Diagnosis of the bacterial overgrowth syndrome is done by all except ?

Harrison's 18th Ed. 2473

- A. Low serum cobalamin level
- B. Low serum folate level
- C. Increased aerobic &/or anaerobic colonic-type bacteria in jejunal aspirate

D. Schilling test

Diagnosis of the bacterial overgrowth syndrome is done by a low serum cobalamin level, elevated serum folate level, increased levels of aerobic and/or anaerobic colonic-type bacteria in a jejunal aspirate, Schilling test. Following tetracycline for 5 days, Schilling test will become normal.

353 For frequent recurrences of bacterial overgrowth syndrome, which of the following treatment strategies is most effective ?

Harrison's 18th Ed. 2474

- A. Antibiotics for 1 week per month
- B. Antibiotics for ~3 weeks
- C. Antibiotics until symptoms remit
- D. Antibiotics continuously

In the presence of frequent recurrences, use of antibiotics for 1 week per month whether or not symptoms are present is most effective.

354 Whipple's disease is caused by the bacteria named ?

Harrison's 18th Ed. 2474

- A. Tropheryma whippeli
- B. Treponema whippeli
- C. Toxoplasma whippeli
- D. Trenoderma whippeli

Whipple's disease is a chronic multisystem disease that presents as diarrhea, steatorrhea, weight loss, arthralgia & CNS and cardiac problems. It is caused by bacteria Tropheryma whippeli.

355 Which of the following statements about Tropheryma whippeli is false ?

Harrison's 18th Ed. 2474

- A. Gram-positive
- B. Actinobacterium
- C. Low virulence, low infectivity
- D. PAS+ macrophages in small intestine

Hallmark of Whipple's disease is the presence of PAS-positive macrophages in small intestine. T. whippeli is a small gram-positive, actinobacterium bacillus, with low virulence but high infectivity.

356 Which of the following about Whipple's disease is false ?

Harrison's 18th Ed. 2474

- A. Multisystem disease
- B. T. whippeli outside macrophages indicates active disease
- C. T. whippeli cannot be grown on culture
- D. Drug of first choice is TMP/SMX for 1 year

Presence of T. whippeli bacillus outside of macrophages is a more important indicator of active disease than within macrophages. T. whippeli has been grown in culture. The current drug of choice is double-strength trimethoprim/sulfamethoxazole for ~1 year.

357 Which of the following about Whipple's disease is false ?

Harrison's 18th Ed. 2474

- A. Drug of second choice is Chloramphenicol
- B. Antibiotic therapy has to be prolonged
- C. Disease recurrence with dementia is a poor prognostic sign
- D. None of the above

If TMP/SMX is not tolerated, chloramphenicol is an appropriate second choice. Recurrence of disease activity, especially with dementia, is an extremely poor prognostic sign.

358 Which of the following is the most common neurologic manifestations of classic Whipple's disease ?

N Engl J Med 2007;356:55-66

- A. Cognitive change
- B. Supranuclear ophthalmoplegia
- C. Oculomasticatory or oculofacioskeletal myorhythmia
- D. Ataxia

Cognitive changes and later dementia are commonest neurologic signs. Movement disorders of eye muscles (oculomasticatory or oculofacioskeletal myorhythmia) are considered pathognomonic for Whipple's disease.

359 Which of the following about protein-losing enteropathy is false ?

Harrison's 18th Ed. 2475

- A. Excess protein loss into gastrointestinal tract
- B. Low serum albumin & globulin in absence of renal & hepatic disease
- C. α_1 -antitrypsin clearance can be useful in diagnosis
- D. Lymphocytosis supports diagnosis

Protein-losing enteropathy is characterized by excess protein loss into gastrointestinal tract. With loss of protein, peripheral lymphocytes are also lost via lymphatics, resulting in a relative lymphopenia. Thus, presence of lymphopenia in a patient with hypoproteinemia supports the presence of increased loss of protein into gastrointestinal tract.

360 Which of the following can cause protein-losing enteropathy ?

Harrison's 18th Ed. 2475

- A. Peripheral vascular disease
- B. Chronic pericarditis
- C. Hemolytic uremic syndrome
- D. Hypothyroidism

361 Hypoproteinemia in intestinal lymphangiectasia should be treated with ?

Harrison's 18th Ed. 2475

- A. SCFA
- B. MCT
- C. LCFA
- D. All of the above

Treatment of hypoproteinemia in intestinal lymphangiectasia is done by low-fat diet and administration of MCTs, which do not exit from intestinal epithelial cells via lymphatics but are delivered to the body via portal vein.

362 Adherence to colonic mucin by E. histolytica trophozoites is mediated by ?

N Engl J Med 2003;348:16

- A. Gal/GalNAc-specific lectin
- B. Gal/GalNAc-specific pepsin
- C. Gal/GalNAc-specific trypsin
- D. Gal/GalNAc-specific capsin

295 - Inflammatory bowel disease

363 Which out of the following countries has the highest incidence of IBD ?

Harrison's 16th Ed. 1776

- A. Sweden
- B. Israel
- C. Greece

D. China

United States, United Kingdom, Norway and Sweden have the highest rates.

364 Out of the following, which ethnic group has the highest prevalence of IBD ?

Harrison's 18th Ed. 2477

- A. Jewish
- B. African American
- C. Hispanic
- D. Asian

Prevalence of IBD in Ashkenazi Jews is ~twice that of Israeli-born, Sephardic, or Oriental Jews. Prevalence decreases progressively in non-Jewish Caucasian, African-American, Hispanic, and Asian populations.

365 Nonmalignant mortality in IBD cases is maximum during ?

Harrison's 18th Ed. 2477

- A. First year of disease
- B. After five years of disease
- C. After ten years of disease
- D. After fifteen years of disease

Highest mortality is during first years of IBD & in long-duration disease due to risk of colon cancer.

366 If a patient has IBD, the lifetime risk that a first degree relative will be similarly affected is ?

Harrison's 18th Ed. 2477

- A. 10 %
- B. 20 %
- C. 30 %
- D. 40 %

Lifetime risk of a first-degree relative of IBD patient is ~10%. If two parents have IBD, each child has a 36% chance of being affected. In twin studies, 58% of monozygotic twins are concordant for CD and 6% are concordant for UC, whereas 4% of dizygotic twins are concordant for CD and none are concordant for UC.

367 Which of the following statements about Ulcerative colitis (UC) and Crohn's disease (CD) is false ?

Harrison's 18th Ed. 2477

- A. Peak age of onset of UC & CD is 15 - 30 years
- B. Second peak occurs between 60 - 80 years
- C. Appendectomy aggravates UC
- D. IBD runs in families

Appendectomy is protective against UC but increases the risk of CD.

368 Which genetic disorder is a predisposing factor for IBD ?

Harrison's 18th Ed. 2477

- A. Turner's syndrome
- B. Down syndrome
- C. Patau syndrome
- D. Edward syndrome

369 IBD is associated with all of the following except ?

Harrison's 18th Ed. 2477

- A. Turner's syndrome
- B. Down syndrome
- C. Selective IgA deficiency
- D. Hereditary angioedema

UC and CD are associated with Turner's syndrome and Hermansky-Pudlak syndrome, Wiskott-Aldrich syndrome and chronic granulomatous disease. Immunodeficiency disorders like hypogammaglobulinemia, selective IgA deficiency and hereditary angioedema also have increased association with IBD.

370 All of the following are predisposing factors for UC except ?

Harrison's 16th Ed. 1776

- A. Jewish ethnicity
- B. High socio-economic status
- C. Smoking
- D. Hermansky-Pudlak syndrome

371 If two parents have IBD, what chance does each child has of being affected ?

Harrison's 18th Ed. 2477

- A. 36 %
- B. 45 %
- C. 66 %
- D. 72 %

If two parents have IBD, each child has a 36% chance of being affected.

372 Which of the following is not associated with increased risk of UC ?

Harrison's 18th Ed. 2477

- A. Urban domicile
- B. High socio-economic status
- C. Former smoker
- D. Appendectomy

Urban areas, high socioeconomic classes have a higher prevalence of IBD. Former smokers have a 1.7-fold increased risk for UC than people who have never smoked. Appendectomy is protective against UC.

373 Disease that are shares genetic risk factors with IBD is ?

Harrison's 18th Ed. 2478

- A. Rheumatoid arthritis
- B. Psoriasis
- C. Systemic lupus erythematosus
- D. All of the above

Diseases and genetic risk factors that are shared with IBD include rheumatoid arthritis (TNFAIP3), psoriasis (IL23R,IL12B), ankylosing spondylitis (IL23R), type 1 diabetes mellitus (IL10,PTPN2), asthma (ORMDL3), and systemic lupus erythematosus (TNFAIP3,IL10).

374 NOD1 gene is now known as ?

- A. CARD1
- B. CARD2
- C. CARD3
- D. CARD4

375 NOD2 gene is now known as ?

Harrison's 17th Ed. 1886

- A. CARD1
- B. CARD5
- C. CARD15
- D. CARD18

Gene CARD4 was formerly called NOD1, and CARD15 was formerly called NOD2. CARD15 means caspase-associated recruitment domain containing protein 15, while NOD2 refers to nucleotide oligomerisation domain 2.

376 The disease-related gene of IBD1 on chromosome 16 is ?

Harrison's 17th Ed. 1886

- A. NOD-1
- B. NOD-2
- C. NOD-3
- D. NOD-4

The IBD1 locus encodes NOD2 (also designated CARD 15).

377 Which of the following IBD subtype has its loci on chromosome 16 ?

Harrison's 17th Ed. 1886

- A. IBD 6
- B. IBD 7
- C. IBD 8
- D. IBD 9

IBD loci are on chromosomes 16q12 (IBD1), 12q13 (IBD2), 6p13 (IBD3), 14q11 (IBD4), 5q31-33 (IBD5), 19p13 (IBD6), 1p36 (IBD7), 16p (IBD8), 3p (IBD9).

378 CARD15 is constitutively expressed in ?

Harrison's 17th Ed. 1886

- A. Paneth cells
- B. Parietal or oxyntic cells
- C. G cells
- D. D cells

Paneth cells are specialised epithelial cells selectively expressed in ileum, located mainly in crypts in close proximity to epithelial stem cells. Paneth cells secrete antibacterial substances. Main antimicrobial factors secreted by Paneth cell include lysozyme, phospholipase A2, trypsin, alpha-defensins & angiogenins.

379 CARD15 protein is expressed in the cytoplasm of ?

Harrison's 17th Ed. 1886

- A. Peripheral blood monocytes
- B. Paneth cells
- C. Dendritic cells
- D. All of the above

CARD15 is expressed by intestinal epithelial cells (Paneth cells, monocytes, macrophages & dendritic cells).

380 Which of the following is false about CARD15 protein ?

Harrison's 17th Ed. 1886

- A. CARD15 was formerly called NOD1
- B. Intracellular recognition protein for bacterial components
- C. Activates nuclear factor kappa B pathway
- D. Gain-of-function mutations are associated with CD

CARD15 protein acts as an intracellular recognition protein for bacterial components such as peptidoglycans and activates nuclear factor kappa B pathway which regulates apoptosis and inflammation. Loss-of-function mutations in CARD15 are highly associated with CD

381 Which of the following genes is associated with innate immunity and autophagy ?

Harrison's 18th Ed. 2478

- A. NOD2
- B. ATG16L1
- C. IRGM
- D. All of the above

Genes that are associated with innate immunity and autophagy are NOD2, ATG16L1, IRGM, JAK2, STAT3 that function in innate immune cells (both parenchymal and hematopoietic) to respond to and clear bacteria, mycobacteria and viruses.

382 Which of the following genes is associated with endoplasmic reticulum (ER) and metabolic stress ?

Harrison's 18th Ed. 2478

- A. XBP1
- B. ORMDL3
- C. OCTN
- D. All of the above

Genes that are associated with endoplasmic reticulum (ER) and metabolic stress are XBP1, ORMDL3, OCTN, which serve to regulate the secretory activity of cells involved in responses to the commensal microbiota such as Paneth and goblet cells and the manner in which intestinal cells respond to the metabolic products of bacteria.

383 Which of the following genes is associated with regulation of adaptive immunity ?

Harrison's 18th Ed. 2478

- A. IL23R
- B. IL12B
- C. IL10
- D. All of the above

Genes that are associated with regulation of adaptive immunity are IL23R, IL12B, IL10, PTPN2, which regulate the balance between inflammatory and regulatory cytokines.

384 Which of the following genes is involved in the development and resolution of inflammation ?

Harrison's 18th Ed. 2478

- A. MST1
- B. CCR6
- C. TNFAIP3
- D. All of the above

Genes that are involved in the development and resolution of inflammation are MST1, CCR6, TNFAIP3, PTGER4 and ultimately leukocyte recruitment and inflammatory mediator production.

385 Lack of immune responsiveness of gut mucosal immune system to dietary antigens is best related to ?

Harrison's 18th Ed. 2478

- A. Intestinal tolerance
- B. Gastric tolerance
- C. Oral tolerance
- D. All of the above

The gut mucosal immune system is normally unreactive to luminal contents due to oral (mucosal) tolerance. In IBD this suppression of inflammation is altered, leading to uncontrolled inflammation.

386 CD4⁺ T helper (T_H) cell that promotes inflammation is ?

Harrison's 18th Ed. 2479

- A. T_H1 cells
- B. T_H2 cells
- C. T_H17 cells
- D. All of the above

CD4⁺ T helper (T_H) cells that promote inflammation are of three major types namely T_H1 cells, T_H2 cells and T_H17 cells.

387 Which of the following is a type of CD4⁺ T cell ?

Harrison's 18th Ed. 2479

- A. T_H1 cells
- B. T_H2 cells
- C. T_H17 cells
- D. All of the above

CD4+ T cells are of three major types : T_H1 cells, T_H2 cells and T_H17 cells.

388 T_H2 of CD4 + T cells produce all except ?

Harrison's 18th Ed. 2479

- A. Interferon- γ (IFN- γ)
- B. Interleukin -4 (IL-4)
- C. Interleukin -5 (IL-5)
- D. Interleukin -13 (IL-13)

CD4+ T cells are composed of Th1 cells, that produce interferon-gamma (IFN- γ), and Th2 cells that produce interleukin-4, IL-5 and IL-13.

389 Interferon (IFN) gamma is secreted by which of the following ?

Harrison's 18th Ed. 2479

- A. T_H1 cells
- B. T_H2 cells
- C. T_H17 cells
- D. All of the above

T_H1 cells secrete interferon (IFN) gamma, T_H2 cells secrete IL-4, IL-5, IL-13, and T_H17 cells secrete IL-17, IL-21.

390 Which of the following cells induce transmural granulomatous inflammation that resembles CD ?

Harrison's 18th Ed. 2479

- A. T_H1 cells
- B. T_H2 cells
- C. T_H17 cells
- D. All of the above

T_H1 cells induce transmural granulomatous inflammation that resembles CD.

391 Which of the following cells induce superficial mucosal inflammation resembling UC ?

Harrison's 18th Ed. 2479

- A. T_H1 cells
- B. T_H2 cells
- C. T_H17 cells
- D. All of the above

T_H2 cells, & related natural killer T cells that secrete IL-13 induce superficial mucosal inflammation resembling UC. T_H17 cells may be responsible for neutrophilic recruitment.

392 The T_H1 cytokine pathway is initiated by ?

Harrison's 18th Ed. 2479

- A. IL-4
- B. IL-6
- C. IL-12
- D. IL-23

The T_H1 cytokine pathway is initiated by IL-12. IL-4 and IL-23, together with IL-6 and TGF-beta, induce T_H2 and T_H17 cells, respectively.

393 Which of the following is also called "lymphotoxin" ?

- A. TNF- α
- B. TNF- β
- C. IFN- α
- D. IFN- γ

Tumor-necrosis factor-beta (TNF- β) is also known as lymphotoxin.

394 Levels of which of the following is elevated in IBD ?

N Engl J Med 2009;361:2066-78

- A. Tumor necrosis factor α (TNF- α)
- B. Interleukin-1 β
- C. Interferon- γ
- D. All of the above

Levels of tumor necrosis factor α (TNF- α), interleukin-1 β , interferon- γ , and cytokines of the interleukin-23-Th17 pathway are elevated in IBD.

395 In unstimulated cells, NF- κ B is found in ?

N Engl J Med 1997;336:1067

- A. Nucleus
- B. Cytoplasm
- C. Cell membrane
- D. All of the above

NF- κ B (nuclear factor kappa-light-chain-enhancer of activated B cells) is located in the cytosol complexed with the inhibitory protein I κ B.

396 In unstimulated cells, NF- κ B remains bound to ?

N Engl J Med 1997;336:1067

- A. G- κ B
- B. H- κ B
- C. I- κ B
- D. J- κ B

In unstimulated cells, the NF- κ B dimers are sequestered in cytoplasm by a family of inhibitors, called I κ B (Inhibitor of κ B). Activation of NF- κ B is initiated by signal-induced degradation of I κ B which occurs via activation of a kinase called the I κ B kinase (IKK). With degradation of I κ B inhibitor, NF- κ B complex is freed to enter the nucleus where it activates expression of genes that have DNA-binding sites for NF- κ B leading to physiological responses like inflammatory or immune response, cell survival response, cellular proliferation and activating expression of its own repressor, I κ B. I κ B then re-inhibits NF- κ B (auto feedback loop).

397 Which of the following can activate NF- κ B ?

N Engl J Med 1997;336:1067

- A. Cytokines
- B. Activators of protein kinase C
- C. Viruses
- D. All of the above

NF- κ B is a rapidly acting primary transcription factor found in all cell types. It is activated activated through TLR-4 by cytokines, activators of protein kinase C, bacteria / viruses, stress, UV.

398 Which of the following is not a probiotic ?

Harrison's 18th Ed. 2480

- A. Lactobacillus sp.
- B. Taenia suis
- C. Campylobacter sp.
- D. Saccharomyces boulardii

Salmonella sp., Shigella sp., Campylobacter sp., Clostridium difficile are pathogens that may initiate IBD by triggering an inflammatory response. While Faecalibacterium prausnitzii, Lactobacillus, Bifidobacterium, Taenia suis, and Saccharomyces boulardii are probiotics that may inhibit inflammation.

399 What proportion of UC patients have involvement of whole colon ?

Harrison's 18th Ed. 2480

- A. 10 %
- B. 20 %
- C. 30 %
- D. 40 %

~40-50% of UC patients have disease limited to rectum & rectosigmoid, 30-40% have disease extending beyond sigmoid but not involving whole colon. 20% have a total colitis.

400 Backwash ileitis occurs when which part of colon is involved in UC ?

Harrison's 18th Ed. 2480

- A. Ascending colon
- B. Transverse colon
- C. Descending colon
- D. Whole colon

UC is a mucosal disease that almost always involves rectum and extends proximally to involve colon in continuity without areas of uninvolved mucosa. When "whole colon" is involved, inflammation extends 1-2 cm into terminal ileum in 10-20% of patients. This is called backwash ileitis.

401 Psychosocial factors can contribute to worsening of symptoms in which of the following illnesses ?

Harrison's 17th Ed. 1887

- A. IBD
- B. Chronic back pain
- C. Amyotrophic lateral sclerosis
- D. All of the above

402 Which of the following statements about pathology of Ulcerative colitis (UC) is false ?

Harrison's 18th Ed. 2480

- A. Mucosal disease involving rectum and colon
- B. Proximal spread occurs in continuity
- C. Sandpaper like appearance of mucosa reflects severe inflammation
- D. Inflammatory polyps (pseudopolyps) are due to epithelial regeneration

In UC, with "mild inflammation" mucosa is erythematous & has a fine granular surface that looks like sandpaper.

403 Which of the following statements about pathology of Ulcerative colitis (UC) is false ?

Harrison's 18th Ed. 2480, Figure 295-2

- A. Limited to mucosa & superficial submucosa
- B. Crypt architecture of colon is preserved
- C. Basal lymphoplasmacytosis suggests chronicity
- D. Cryptitis and crypt atrophy

UC process is limited to mucosa and superficial submucosa, with deeper layers unaffected except in fulminant disease. Histologic features that suggest chronicity are that crypt architecture of colon is distorted and presence of basal plasma cells and multiple basal lymphoid aggregates.

404 Which of the following statements about pathology of Crohn's disease (CD) is false ?

Harrison's 18th Ed. 2480

- A. Can affect any part of gastrointestinal tract
- B. Terminal ileum involved in 90% of patients
- C. Rectum is always involved in CD
- D. Segmental with skip areas

Unlike UC, which almost always involves the rectum, the rectum is often spared in CD.

405 Which of the following statements about pathology of Crohn's disease (CD) is false ?

Harrison's 18th Ed. 2480

- A. Perirectal fistulas, abscesses & anal stenosis common
- B. Never involves liver & pancreas
- C. Transmural process
- D. "Cobblestone" appearance on endoscopy

In CD, granulomas are seen in lymph nodes, mesentery, peritoneum, liver & pancreas.

406 "Cobblestone mucosa" in CD is mainly seen in ?

Harrison's 18th Ed. 2481

- A. Sigmoid colon
- B. Transverse colon
- C. Ileum
- D. Rectum

Unlike UC, CD is a transmural process. CD is segmental with skip areas in the midst of diseased intestine. In CD, stellate ulcerations fuse longitudinally & transversely to demarcate islands of mucosa that are histologically normal. This "cobblestone" appearance is characteristic of CD, endoscopically and by barium radiography. Oral mucosal lesions in CD include aphthous stomatitis & "cobblestone" lesions of the buccal mucosa.

407 Which of the following statements about pathology of Crohn's disease (CD) is false ?

Harrison's 18th Ed. 2480

- A. Earliest lesions are aphthoid ulcerations & focal crypt abscesses
- B. Caseating granulomas in all bowel wall layers common
- C. Granulomas can be seen in liver & pancreas
- D. Granulomas can be seen in lymph nodes, mesentery, peritoneum

In CD, earliest lesions are aphthoid ulcerations & focal crypt abscesses with loose aggregations of macrophages, forming "noncaseating" granulomas in all layers of bowel wall.

408 In CD, "Creeping fat" is the term given to ?

Harrison's 17th Ed. 1888

- A. Excessive enlargement of omentum
- B. Necrosis of omentum
- C. Projections of thickened mesentery encasing bowel
- D. Fatty adhesions

Projections of thickened mesentery encase the bowel is termed as "creeping fat".

409 Which of the following is not a major symptom of UC ?

Harrison's 18th Ed. 2481

- A. Rectal bleeding
- B. Constipation
- C. Crampy abdominal pain
- D. Tenesmus

The major symptoms of UC are diarrhea, rectal bleeding, tenesmus, passage of mucus, and crampy abdominal pain. Other symptoms in moderate to severe disease include anorexia, nausea, vomiting, fever, and weight loss.

410 Which of the following statements about clinical features of Ulcerative colitis (UC) is false ?

Harrison's 18th Ed. 2481

- A. Tenesmus is a major symptom
- B. Severity of symptoms do not correlate with extent of disease

- C. Constipation seen in patients with distal disease
- D. Diarrhea is often nocturnal and/or postprandial

Severity of symptoms correlates with the extent of disease.

411 Which is not a manifestation severe UC ?

Harrison's 18th Ed. 2482, Table 295-4

- A. Bowel movements 4-6/day
- B. Mean body temperature $>37.5^{\circ}\text{C}$
- C. Mean pulse rate > 90 / minute
- D. ESR > 30 mm in first hour

In severe UC, bowel movements are >6 per day.

412 In severe ulcerative colitis, number of bowel movements per day is ?

Harrison's 18th Ed. 2482, Table 295-4

- A. 2 - 3
- B. 3 - 4
- C. 4 - 5
- D. > 6

413 Which of the following about investigative features of Ulcerative colitis (UC) is false ?

Harrison's 17th Ed. 1889

- A. CRP levels may rise in active disease
- B. Orosomucoid levels may rise in active disease
- C. Leukocytosis is a specific indicator of disease activity
- D. Proctitis or proctosigmoiditis rarely cause rise in CRP

In UC, leukocytosis occurs but is not a specific indicator of disease activity. Proctitis or proctosigmoiditis rarely causes a rise in CRP.

414 Which of the following is a highly sensitive & specific marker for detecting intestinal inflammation ?

Harrison's 18th Ed. 2482

- A. Fecal lactoferrin
- B. Fecal transferrin
- C. Fecal hemolysin
- D. Fecal reactin

Fecal lactoferrin is a highly sensitive and specific marker of fecal leukocytes and for detecting intestinal inflammation, tested by latex agglutination & enzyme-linked immunosorbent assays.

415 Which of the following about fecal calprotectin is false ?

Harrison's 18th Ed. 2482

- A. Levels correlate well with histologic inflammation
- B. Predict relapses
- C. Detects pouchitis
- D. None of the above

Fecal calprotectin levels correlate well with histologic inflammation, predict relapses, and detect pouchitis.

416 Which of the following is false about "fecal calprotectin" ?

Harrison's 17th Ed. 1889

- A. Neutrophilic cytosolic protein
- B. Resistant to colonic bacterial degradation
- C. Formerly called L1 protein
- D. None of the above

417 Which of the following is false about "fecal calprotectin" ?

Harrison's 17th Ed. 1889

- A. Calcium binding
- B. Has antimicrobial properties
- C. Predict relapses in IBD
- D. None of the above

Fecal Calprotectin is a neutrophilic cytosolic protein, first isolated from granulocytes by Fagerhol and named L1 protein. It was renamed calprotectin upon identification of its calcium binding, antimicrobial properties and resistance to colonic bacterial degradation. Calprotectin, although present in blood, enters bowel lumen as part of an inflammatory process. It is positive in stools of IBD and colorectal cancer patients. Fecal calprotectin & lactoferrin is useful in predicting impending clinical relapse in CD & UC patients.

418 Which of the following about investigative features of Ulcerative colitis (UC) is false ?

Harrison's 18th Ed. 2482

- A. Barium enema shows fine mucosal granularity
- B. "Collar-button" ulcers seen in barium enema
- C. Loss of haustration occurs in early disease
- D. Colon can become short & narrowed

Loss of haustration occur in patients with long-standing disease. "Collar-button" ulcers indicate deep ulcerations with penetration into mucosa.

419 Which of the following statements about complications of Ulcerative colitis (UC) is false ?

Harrison's 18th Ed. 2482

- A. Toxic megacolon means a transverse colon with diameter > 6 cm, with loss of haustration
- B. Toxic megacolon can be triggered by electrolyte abnormalities and narcotics
- C. In toxic colitis and severe ulcerations, bowel may perforate without first dilating
- D. UC patients never develop anal fissures, perianal abscesses

UC patients occasionally develop anal fissures, perianal abscesses, or hemorrhoids, but occurrence of extensive perianal lesions should suggest CD.

420 Which of the following statements about clinical features of Crohn's disease (CD) is false ?

Harrison's 18th Ed. 2483

- A. Can be of fibrostenotic-obstructing or penetrating-fistulous pattern
- B. Most common site of inflammation is caecum
- C. Presentation may mimic acute appendicitis
- D. Radiographic "string sign" refers to narrowed intestinal lumen

In CD, the most common site of inflammation is terminal ileum.

421 Radiographic "String sign" in CD is due to ?

Harrison's 18th Ed. 2483

- A. Oedema of bowel wall
- B. Thickening of bowel wall
- C. Fibrosis of bowel wall
- D. All of the above

Transmural inflammation of CD causes decreased luminal diameter & limited distensibility. Radiographic "string sign" represents long areas of circumferential inflammation & fibrosis causing long segments of luminal narrowing. Edema, bowel wall thickening & fibrosis of bowel wall account for the radiographic "string sign" of a narrowed intestinal lumen.

422 Which of the following is not a feature of pain in CD ?*Harrison's 18th Ed. 2483*

- A Colicky
- B. Precedes defecation
- C. Relieved by defecation
- D. Continues after defecation

*Pain is colicky, precedes and is relieved by defecation.***423 Right lower quadrant abdominal inflammatory mass in CD is composed of ?***Harrison's 18th Ed. 2483*

- A Inflamed bowel
- B. Adherent and indurated mesentery
- C. Enlarged abdominal lymph nodes
- D. All of the above

*Abdominal mass in CD is composed of inflamed bowel, adherent and indurated mesentery, and enlarged abdominal lymph nodes.***424 Radiographic "string sign" of a narrowed intestinal lumen in CD is due to ?***Harrison's 18th Ed. 2483*

- A Edema of bowel wall
- B. Bowel wall thickening
- C. Fibrosis of bowel wall
- D. All of the above

*Edema, bowel wall thickening, and fibrosis of the bowel wall within the mass account for the radiographic "string sign" of a narrowed intestinal lumen. "String sign" represents long areas of circumferential inflammation and fibrosis, resulting in long segments of luminal narrowing.***425 Factors recognized to exacerbate CD include ?***Am J Gastroenterol 2009; 104:465-483*

- A Intercurrent infections
- B. Cigarette smoking
- C. Non-steroidal anti-inflammatory drugs
- D. All of the above

*Factors recognized to exacerbate CD include intercurrent infections (both upper respiratory tract & enteric infections, including C. difficile), cigarette smoking & non-steroidal anti-inflammatory drugs.***426 Which of the following statements about clinical features of Crohn's disease (CD) is false ?***Harrison's 18th Ed. 2483*

- A Pneumaturia may be present
- B. Fecaluria may be present
- C. Enterocutaneous fistulas may be present
- D. Enterocolic fistulas may be present

*Severe inflammation of ileocecal region may lead to microperforation and fistula formation to adjacent bowel, skin, urinary bladder, to abscess cavity in mesentery, or vagina.***427 In Crohn's disease (CD), intestinal malabsorption can cause all except ?***Harrison's 18th Ed. 2483*

- A Hyperoxaluria
- B. Hypocalcemia
- C. Hypomagnesemia
- D. Hypokalemia

*In CD, intestinal malabsorption can cause anemia, hypoalbuminemia, hypocalcemia, hypomagnesemia, coagulopathy, hyperoxaluria, vitamin D deficiency and vitamin B₁₂ deficiency.***428 Diarrhea in active CD is caused by ?***Harrison's 18th Ed. 2483*

- A Bacterial overgrowth
- B. Bile-acid malabsorption
- C. Intestinal inflammation
- D. All of the above

*Causes of diarrhea in active CD include bacterial overgrowth in obstructive stasis or fistulization, bile-acid malabsorption due to diseased or resected terminal ileum & intestinal inflammation with decreased water absorption, increased secretion of electrolytes and decreased rectal compliance.***429 Which of the following about CD is false ?***Harrison's 18th Ed. 2483*

- A Epigastric pain
- B. H. pylori negative gastritis
- C. Second part of duodenum more commonly involved
- D. None of the above

430 Which of the following statements about investigations of Crohn's disease (CD) is false ?*Harrison's 18th Ed. 2483*

- A Elevated ESR
- B. Elevated CRP
- C. Leucopenia
- D. Hypoalbuminemia

*Laboratory abnormalities in CD include elevated ESR & CRP, hypoalbuminemia, anemia & leukocytosis.***431 Endoscopic features of Crohn's disease (CD) is false ?***Harrison's 18th Ed. 2483*

- A Rectal sparing
- B. Aphthous ulcerations & skip lesions
- C. Fistulas
- D. None of the above

*Endoscopic features of CD include rectal sparing, aphthous ulcerations, fistulas, and skip lesions.***432 Earliest macroscopic findings of colonic CD is ?***Harrison's 18th Ed. 2483*

- A Aphthous ulcers
- B. Longitudinal stellate, serpiginous, & linear ulcers
- C. Fistulas
- D. Polyyps

*Earliest macroscopic findings of colonic CD are aphthous ulcers which are small, multiple ulcers separated by normal intervening mucosa.***433 Which out of the following is the first-line test for evaluation of suspected CD and its complications ?***Harrison's 18th Ed. 2484*

- A USG
- B. MRI
- C. CT enterography
- D. Endoscopy

CT enterography permits visualization of entire small bowel for inflammation associated with CD by displaying mural hyperenhancement, interloop sinus tracts, mesenteric fat stranding, engorged

vasa recta and perienteric inflammatory changes. MRI may superior for demonstrating pelvic lesions like ischiorectal abscesses.

434 Which of the following statements about complications of Crohn's disease (CD) is false ?

Harrison's 18th Ed. 2484

- A Serosal adhesions common
- B Free perforation common in duodenum
- C Systemic glucocorticoid therapy increase risk of intraabdominal & pelvic abscesses
- D Perianal disease common

Perforation occur usually in ileum but occasionally in jejunum.

435 Which of the following antibody reactivity to antigens is associated with CD ?

Harrison's 18th Ed. 2485

- A Bacterial flagellin (CBir1)
- B Outer membrane porin C (OmpC)
- C Bacterial sequence I2 (anti-I2)
- D All of the above

Presence of antibody reactivity to antigens like oligomannan (ASCA, anti-Saccharomyces cerevisiae antibody), E. coli outer membrane porin C (OmpC), bacterial (Pseudomonas fluorescens) sequence I2 (anti-I2), and bacterial flagellin (CBir1) are associated with CD.

436 Autoantibody found in cases of UC is ?

Harrison's 18th Ed. 2485

- A Anti dsDNA
- B cANCA
- C pANCA
- D Antimitochondrial

pANCA positivity is found in about 60 - 70% of UC patients and 5 - 10% of CD patients.

437 Which of the following statements about serological diagnosis of IBD is false ?

Harrison's 18th Ed. 2485

- A pANCA (+) in 5-10% of UC & 60-70% of CD patients
- B 5-15% of I^o relatives of UC patients are pANCA (+)
- C pANCA positivity is associated with pancolitis, early surgery, and primary sclerosing cholangitis
- D pANCA in CD is associated with colonic disease

pANCA positivity is found in about 60-70% of UC patients and 5-10% of CD patients.

438 Which of the following about ASCA in IBD is false ?

Harrison's 18th Ed. 2485

- A ASCA is associated with large bowel CD
- B 60-70% of CD, 10-15% of UC patients are ASCA (+)
- C ASCA positivity is associated with increased & early CD complications
- D Saccharomyces cerevisiae is Brewer's or Baker's yeast.

The presence of both Anti-Saccharomyces cerevisiae antibodies (ASCA) IgG and IgA is highly specific for the presence of Crohn's disease. ASCA is the most sensitive serologic marker of Crohn's disease. Saccharomyces cerevisiae is Brewer's or Baker's yeast.

439 Which of the following about serology of CD is false ?

Harrison's 18th Ed. 2485

- A Omp C (+) patients more likely to have internal perforating disease

- B I₂ (+) patients more likely to have fibrostenosing disease
- C Anti-CBir1 expression is associated with small-bowel disease, fibrostenosing, and internal penetrating disease
- D None of the above

Omp C-positive patients are more likely to have internal perforating disease; and I₂ positive patients are more likely to have fibrostenosing disease. Anti-CBir1 expression is associated with small-bowel disease, fibrostenosing, and internal penetrating disease.

440 Cases of IBD that cannot be categorized as UC or CD are termed ?

Harrison's 18th Ed. 2485

- A Indeterminate colitis
- B Lymphocytic colitis
- C Diversion colitis
- D Collagenous colitis

Cases of IBD that cannot be categorized as UC or CD are called indeterminate colitis. IBD cases cannot be distinguished between UC & CD in ~15% of cases.

441 Which of the following is independently associated with disabling CD after 5 years ?

Harrison's 18th Ed. 2485

- A Age at diagnosis below 40 years
- B ASCA positivity
- C pANCA positivity
- D Rectal involvement

Features of CD that have been shown to be independently associated with subsequent disabling CD after 5 years are initial requirement for glucocorticoid use, age at diagnosis below 40 years and presence of perianal disease at diagnosis.

442 All of the following are true for CD except ?

Harrison's 18th Ed. 2486, Table 295-5

- A Abdominal mass
- B pANCA positivity
- C Response to antibiotics
- D Recurrence after surgery

443 Which of the following can cause proctitis ?

Harrison's 18th Ed. 2486

- A Gonorrhea
- B Chlamydia
- C Syphilis
- D All of the above

Gonorrhea, Chlamydia, and syphilis can cause proctitis.

444 Which of the following can cause watery diarrhea ?

Harrison's 18th Ed. 2486

- A Salmonella
- B Shigella
- C C. difficile
- D All of the above

Apart from above three, the main symptom in Collagenous colitis is chronic watery diarrhea.

445 Parasitic infections that mimic IBD include all except ?

Harrison's 18th Ed. 2486, Table 295-6

- A Necator americanus
- B Trichuris trichiura

- C. Strongyloides stercoralis
- D. Enterobius vermicularis

Parasitic infections that may mimic IBD include hookworm (*Necator americanus*), whipworm (*Trichuris trichiura*), *Strongyloides stercoralis*, *Isospora belli* and *Entamoeba histolytica*.

446 Which of the following IBD patients are at higher risk for developing extraintestinal manifestations ?

Harrison's 16th Ed. 1783

- A. IBD with Selective IgA deficiency
- B. IBD with granulomas
- C. Perianal Crohn's disease
- D. IBD with Turner's syndrome

447 Patients with inflammatory bowel disease are at risk for ?

N Engl J Med 2009;361:2066-78

- A. Primary sclerosing cholangitis
- B. Ankylosing spondylitis
- C. Psoriasis
- D. All of the above

Patients with IBD are at risk for primary sclerosing cholangitis, ankylosing spondylitis, and psoriasis.

448 Which of the following is false about collagenous colitis ?

Harrison's 18th Ed. 2487

- A. Increased subepithelial collagen deposition
- B. Male to female ratio is 9:1
- C. Most patients present in 6th or 7th decades
- D. Main symptom is chronic watery diarrhea

Female to male ratio is 9:1.

449 Which of the following is false about Erythema nodosum (EN) in IBD ?

Harrison's 18th Ed. 2487

- A. Correlate with bowel activity
- B. Develop after onset of bowel symptoms
- C. Concomitant active peripheral arthritis
- D. None of the above

EN occurs in ~15% of CD and 10% of UC patients. Attacks correlate with bowel activity, develop after onset of bowel symptoms, and frequently have concomitant active peripheral arthritis.

450 Which of the following is false about Erythema nodosum ?

Harrison's 18th Ed. 2487

- A. Erythematous tender nodules
- B. 1-5 cm in diameter
- C. Found on anterior surface of lower legs and arms
- D. None of the above

Lesions of EN are hot, red, tender nodules measuring 1-5 cm in diameter and found on anterior surface of lower legs, ankles, calves, thighs and arms.

451 Which of the following is false about Pyoderma gangrenosum (PG) in IBD ?

Harrison's 18th Ed. 2487

- A. May occur years before onset of bowel symptoms
- B. Independent of the bowel disease
- C. Respond poorly to colectomy
- D. None of the above

PG occurs years before the onset of bowel symptoms, is independent of bowel disease & respond poorly to colectomy, usually associated with severe disease.

452 Which of the following is false about Pyoderma gangrenosum (PG) ?

Harrison's 18th Ed. 2487

- A. Found on dorsal surface of feet and legs
- B. Usually begins as a macule
- C. May be single or multiple
- D. Difficult to treat

PG usually begins as a pustule and then spreads concentrically to rapidly undermine healthy skin.

453 Dermatologic manifestations of IBD include all except ?

Harrison's 18th Ed. 2487

- A. Erythema nodosum (EN)
- B. Pyoderma gangrenosum (PG)
- C. Pyoderma vegetans
- D. Erythema marginatum

454 Dermatologic manifestations of IBD include all except ?

Harrison's 18th Ed. 2487

- A. Pyostomatitis vegetans
- B. Alopecia
- C. Perianal skin tags
- D. Psoriasis

455 Which of the following skin lesions is most frequent in CD ?

Harrison's 18th Ed. 2487

- A. Erythema nodosum (EN)
- B. Pyoderma gangrenosum (PG)
- C. Psoriasis
- D. Perianal skin tags

Perianal skin tags are found in 75 - 80% of patients with CD, especially those with colon involvement.

456 Peripheral arthritis that develops in IBD patients involves which of the following joints ?

Harrison's 18th Ed. 2488

- A. Small joints of upper & lower extremities
- B. Large joints of upper & lower extremities
- C. Small joints of upper extremity
- D. Small joints of lower extremity

Peripheral arthritis of IBD patients is asymmetric, polyarticular and migratory and affects large joints of upper and lower extremities.

457 Rheumatologic manifestations of IBD include all except ?

Harrison's 18th Ed. 2488

- A. Peripheral arthritis
- B. Ankylosing spondylitis (AS)
- C. Osteopetrosis
- D. Sacroiliitis

458 Rheumatologic manifestations of IBD include all except ?

Harrison's 18th Ed. 2488

- A. Hypertrophic osteoarthropathy

- B. Pelvic/femoral osteomyelitis
- C. Relapsing polychondritis
- D. Costochondritis

459 Which of the following skeletal disease occurs equally in UC and CD ?

Harrison's 18th Ed. 2488

- A. Peripheral arthritis
- B. Ankylosing spondylitis (AS)
- C. Sacroiliitis
- D. All of the above

Symmetric sacroiliitis occurs equally in UC & CD. Peripheral arthritis and ankylosing spondylitis are more common in CD than UC.

460 Ocular manifestations of IBD include all except ?

Harrison's 18th Ed. 2488

- A. Conjunctivitis
- B. Anterior uveitis / iritis
- C. Episcleritis
- D. Retinitis

Ocular manifestations of IBD include conjunctivitis, anterior uveitis/iritis, and episcleritis.

461 Common hepatobiliary manifestations of IBD include all except ?

Harrison's 18th Ed. 2488

- A. Hepatic steatosis
- B. Pancreatitis
- C. Cholelithiasis
- D. Primary sclerosing cholangitis (PSC)

Pancreatitis is a rare extraintestinal manifestation of IBD and results from duodenal fistulas, ampullary CD, gallstones, PSC, autoimmune pancreatitis and primary CD of the pancreas.

462 All are complications of UC except ?

Harrison's 16th Ed. 1780

- A. Hemorrhage
- B. Malignant change
- C. Intusussception
- D. Polyposis

463 Urologic manifestations of IBD include all except ?

Harrison's 18th Ed. 2488

- A. Calculi
- B. Ureteral obstruction
- C. Ileal bladder fistulas
- D. Glomerulonephritis

464 Hypercoagulable state in IBD is due to all except ?

Harrison's 16th Ed. 1784, Harrison's 17th Ed. 1894

- A. Reactive thrombocytosis
- B. Increased fibrinopeptide A, factor V, VIII & fibrinogen
- C. Decreased thromboplastin generation
- D. Antithrombin III deficiency

In IBD, risk of venous & arterial thrombosis increases even when disease is not active due to abnormalities of platelet-endothelial interaction, hyperhomocysteinemia, alterations in coagulation cascade, impaired fibrinolysis, involvement of tissue factor-bearing microvesicles, disruption of normal coagulation system by autoantibodies, vasculitides and genetic predisposition.

465 Cardiopulmonary manifestations of IBD include all except ?

Harrison's 18th Ed. 2489

- A. Endocarditis / Myocarditis
- B. Pleuropericarditis
- C. Interstitial lung disease (ILD)
- D. Obstructive lung disease

In IBD, cardiopulmonary manifestations include endocarditis, myocarditis, pleuropericarditis, & ILD.

466 Most common extraintestinal pulmonary complication of IBD is ?

Harrison's 18th Ed. 2489

- A. ILD
- B. Pneumonitis
- C. Malignancy
- D. Obstructive lung disease

467 Role of sulfasalazine is not clear in which of the following ?

Harrison's 18th Ed. 2489

- A. Inducing remission in UC
- B. Maintaining remission in UC
- C. Inducing remission in CD
- D. Maintaining remission in CD

Sulfasalazine and other 5-ASA agents are effective at inducing and maintaining remission in UC with limited role in inducing remission in CD but no clear role in maintenance of CD. The most convincing evidence for use of sulfasalazine is treatment of active CD involving colon.

468 Name of the bond linking the sulfa and 5-ASA moieties in Sulfasalazine is ?

Harrison's 18th Ed. 2489

- A. Azo bond
- B. Thio bond
- C. Tau bond
- D. Conn bond

Sulfasalazine is broken down in colon by bacterial azo reductases. They cleave the azo bond linking the sulfa and 5-ASA moieties.

469 With Sulfasalazine therapy, which of the following should be supplemented ?

Harrison's 18th Ed. 2489

- A. Iron
- B. Folic acid
- C. Vitamin B₁₂
- D. Pyridoxine

Sulfasalazine can also impair folate absorption, and patients should be given folic acid supplements.

470 Sulfasalazine intolerable side effects are attributable to ?

Harrison's 18th Ed. 2489

- A. Sulfapyridine moiety
- B. Sulfasalicylic moiety
- C. Sulfaphenol moiety
- D. All of the above

Allergic reactions or intolerable side effects of sulfasalazine are attributable to sulfapyridine moiety.

471 Hypersensitivity reactions to Sulfasalazine include all except ?*Harrison's 18th Ed. 2489*

- A. Hepatitis
- B. Thrombocytosis
- C. Worsening of colitis
- D. Reversible sperm abnormalities

Hypersensitivity reactions of sulfasalazine include rash, fever, hepatitis, agranulocytosis, hypersensitivity pneumonitis, pancreatitis, worsening of colitis and reversible sperm abnormalities.

472 Which out of the following mesalamine formulation has ethylcellulose coating ?*Harrison's 18th Ed. 2489*

- A. Asacol
- B. Balsalazide
- C. Claversal
- D. Pentasa

Pentasa is a mesalamine formulation that has an ethylcellulose coating to allow water absorption into small beads containing mesalamine.

473 Which of the following is composed of two 5-ASA radicals linked by an azo bond ?*Harrison's 18th Ed. 2489*

- A. Asacol
- B. Balsalazide
- C. Claversal
- D. Olsalazine

Olsalazine is composed of two 5-ASA radicals linked by an azo bond, which is split in the colon by bacterial reduction and two 5-ASA molecules are released.

474 5-ASA agents act within what period of time ?*Harrison's 18th Ed. 2489*

- A. 6 - 12 hours
- B. 1 - 7 days
- C. 2 - 4 weeks
- D. 4 - 6 weeks

As a general rule, 5-ASA agents act within 2 - 4 weeks.

475 Treatment of choice in severe UC is ?*Harrison's 16th Ed. 1786*

- A. 5-ASA
- B. Azathioprine
- C. Metronidazole
- D. Oral glucocorticoid

476 Which of the following is false regarding treatment of IBD ?*Harrison's 18th Ed. 2490*

- A. Antibiotics have no role in treatment of active or quiescent UC
- B. Glucocorticoids useful in maintenance therapy in UC & CD
- C. 5-ASA effective in inducing remission in UC & CD
- D. 5-ASA useful in maintaining remission in UC

Glucocorticoids play no role in maintenance therapy in UC or CD. 5-ASA is effective in inducing remission in UC & CD & maintaining remission in UC. Its role in remission maintenance in CD is not established.

477 Which of the following side effects of glucocorticoid therapy in IBD is not related to dose & duration of therapy ?*Harrison's 18th Ed. 2490*

- A. Abdominal striae
- B. Subcapsular cataract
- C. Osteonecrosis
- D. Emotional disturbances

Most of these side effects of glucocorticoids, other than osteonecrosis, are related to dose and duration of therapy.

478 First line treatment in active inflammatory, fistulizing and perianal CD is ?*Harrison's 18th Ed. 2490*

- A. 5-ASA
- B. Azathioprine
- C. Metronidazole
- D. Salicylates

Metronidazole is effective in active inflammatory, fistulous, and perianal CD and may prevent recurrence after ileal resection.

479 First line treatment in active inflammatory, fistulizing and perianal CD is ?*Harrison's 18th Ed. 2490*

- A. 5-ASA
- B. Azathioprine
- C. Ciprofloxacin
- D. Salicylates

Both ciprofloxacin and metronidazole antibiotics can be used as first-line drugs for short periods of time in active inflammatory, fistulizing and perianal CD.

480 Achilles tendinitis and rupture is associated with which of the following medicines ?*Harrison's 18th Ed. 2490*

- A. Azathioprine
- B. Glucocorticoids
- C. Ciprofloxacin
- D. Metronidazole

Ciprofloxacin has recently been associated with Achilles tendinitis and rupture.

481 Active end product of Azathioprine is ?*Harrison's 18th Ed. 2490*

- A. 6-MP
- B. Thioinosinic acid
- C. Inosinic acid
- D. Thioguanic acid

Azathioprine is converted to 6-MP, which is metabolized to active end product, thioinosinic acid, an inhibitor of purine ribonucleotide synthesis and cell proliferation.

482 Which of the following drugs is used for postoperative prophylaxis of CD ?*Harrison's 18th Ed. 2490*

- A. 5-ASA
- B. Azathioprine
- C. Metronidazole
- D. Salicylates

6-MP or azathioprine is effective for postoperative prophylaxis of CD.

483 Which of the following statements about azathioprine use in IBD is false ?

Harrison's 18th Ed. 2490

- A. Pancreatitis as a side effect is completely reversible on stopping drug
- B. Thiopurine methyltransferase is the enzyme responsible for its metabolism
- C. No increased risk of cancer in IBD patients chronically taking azathioprine
- D. Leukopenia is dose-related and delayed

IBD patients treated with azathioprine/6-MP are at a fourfold increased risk of developing a lymphoma due to medications, underlying disease, or both.

484 Methotrexate (MTX) inhibits which of the following ?

Harrison's 18th Ed. 2491

- A. Dihydrofolate reductase
- B. HMG-CoA reductase
- C. Trypanothione reductase
- D. Fumarate reductase

Methotrexate (MTX) inhibits dihydrofolate reductase, resulting in impaired DNA synthesis. Additional anti-inflammatory properties may be related to decreased IL-1 production.

485 Potential toxicities of Methotrexate include all except ?

Harrison's 18th Ed. 2491

- A. Leukopenia
- B. Hepatic fibrosis
- C. Hypersensitivity pneumonitis
- D. Cholelithiasis

Potential toxicities of MTX include leukopenia, hepatic fibrosis and hypersensitivity pneumonitis (rarely).

486 Which of the following drugs is a lipophilic peptide ?

Harrison's 18th Ed. 2491

- A. Azathioprine
- B. Methotrexate
- C. Cyclosporine
- D. Tacrolimus

Cyclosporine (CSA) is a lipophilic peptide with inhibitory effects on both the cellular and humoral immune systems.

487 Cyclosporine (CSA) acts by inhibition of ?

Harrison's 18th Ed. 2491

- A. IL-1
- B. IL-2
- C. IFN- α
- D. All of the above

CSA blocks production of IL-2 by T-helper lymphocytes. CSA binds to cyclophilin, and this complex inhibits calcineurin, a cytoplasmic phosphatase enzyme involved in activation of T cells. CSA also indirectly inhibits B cell function by blocking helper T cells.

488 Which of the following is not a side effect of Cyclosporine therapy ?

Harrison's 18th Ed. 2491

- A. Hypertension
- B. Gingival hyperplasia
- C. Alopecia

D. Paresthesias

Creatinine elevation, hypertension, gingival hyperplasia, hypertrichosis, paresthesias, tremors, headaches, and electrolyte abnormalities and seizures are common side effects of Cyclosporine therapy.

489 Seizures may complicate Cyclosporine therapy if there is ?

Harrison's 18th Ed. 2491

- A. Hypcholesterolemia
- B. Hypercholesterolemia
- C. Hypertriglyceridemia
- D. All of the above

Seizures may complicate CSA therapy if the patient is hypomagnesemic or if serum cholesterol levels are <120 mg/dL.

490 Opportunistic infection that commonly occurs with Cyclosporine therapy is ?

Harrison's 18th Ed. 2491

- A. Pneumocystis carinii infection
- B. M. tuberculosis infection
- C. Klebsiella infection
- D. Pseudomonas infection

Opportunistic infections, most often Pneumocystis carinii pneumonia, may occur with CSA combination immunosuppressive treatment.

491 Severe UC patients that are refractory to IV glucocorticoids, should be treated with ?

Harrison's 18th Ed. 2491

- A. IV Cyclosporine
- B. Oral cyclosporine
- C. Azathioprine
- D. 6 Mercaptopurine

CSA is given intravenously in severe UC that is refractory to intravenous glucocorticoids.

492 Tacrolimus has a mechanism of action similar to ?

Harrison's 18th Ed. 2491

- A. Methotrexate
- B. Cyclosporine
- C. Mycophenolate mofetil
- D. Thalidomide

Tacrolimus is a macrolide antibiotic with immunomodulatory properties & mechanism of action similar to CSA.

493 Which of the following drugs is a macrolide antibiotic ?

Harrison's 18th Ed. 2491

- A. Azathioprine
- B. Methotrexate
- C. Cyclosporine
- D. Tacrolimus

Tacrolimus is a macrolide antibiotic with immunomodulatory properties similar to CSA.

494 First biologic therapy approved for Crohn's disease was ?

Harrison's 18th Ed. 2491

- A. Adalimumab
- B. Infliximab
- C. Natalizumab

D. Etanercept

The first biologic therapy approved for Crohn's disease was infliximab.

495 Infliximab is ?

Harrison's 18th Ed. 2491

- A. IgG₁ chimeric monoclonal antibody against TNF
- B. IgG₁ fully human monoclonal antibody against TNF
- C. IgG₄ chimeric monoclonal antibody against TNF
- D. P75 TNF receptor fusion protein

Infliximab is a chimeric mouse-human monoclonal antibody against TNF. It blocks TNF in serum and at cell surface and lyses TNF-producing macrophages & T cells.

496 Anti-TNF monoclonal antibody useful in treatment of moderate to severely active CD in patients is ?

Harrison's 18th Ed. 2491

- A. Infliximab
- B. Adalimumab
- C. Certolizumab pegol
- D. All of the above

Anti-TNF monoclonal antibodies, infliximab, adalimumab, and certolizumab pegol, are effective in the treatment of moderate to severely active CD in patients who have not responded despite complete & adequate therapy with a corticosteroid or an immunosuppressive agent.

497 Infusion reaction that occur with Infliximab therapy is due to ?

Harrison's 18th Ed. 2491

- A. Antibody to Infliximab
- B. Concurrent Methotrexate therapy
- C. Anti ds-DNA antibody
- D. Antinuclear factor

The development of antibodies to infliximab (ATI) is associated with an increased risk of infusion reactions and a decreased response to treatment.

498 Which one of the following is considered to be useful additional therapy with treatment of CD with Infliximab ?

Harrison's 18th Ed. 2491

- A. Oral steroids
- B. 5-ASA
- C. Azathioprine
- D. Elemental diet

If infliximab is used episodically for flares, concomitant immunosuppression with AZA, 6-MP or methotrexate in therapeutic doses is recommended to reduce clinical consequences of immunogenicity of chimeric antibodies. SONIC (Study of Biologic and Immunomodulator-Naïve Patients with Crohn's Disease) Trial compared infliximab plus azathioprine, infliximab alone and azathioprine alone in moderate-to-severe Crohn's disease with infliximab plus azathioprine group showing best results and no greater adverse events.

499 Which of the following is associated with infliximab therapy ?

Harrison's 18th Ed. 2491

- A. Lymphoma
- B. Leukemia
- C. New-onset psoriasis
- D. All of the above

500 Infliximab is not useful in ?

Harrison's 17th Ed. 1896

- A. Crohn's disease
- B. Rheumatoid arthritis
- C. Ankylosing spondylitis
- D. Primary sclerosing cholangitis

501 Which of the following is not an indication of Infliximab therapy ?

Harrison's 16th Ed. 1787

- A. Steroid dependant CD
- B. Fistulizing CD
- C. Maintenance of remission in CD
- D. Mechanical small intestinal obstruction in CD

502 Adalimumab is a ?

Harrison's 18th Ed. 2492

- A. IgG₁ chimeric monoclonal antibody against TNF
- B. IgG₁ recombinant human monoclonal antibody against TNF
- C. IgG₄ chimeric monoclonal antibody against TNF
- D. P75 TNF receptor fusion protein

Less immunogenic than Infliximab, Adalimumab is a recombinant human monoclonal IgG1 antibody containing only human peptide sequences. Adalimumab binds TNF and neutralizes its function by blocking the interaction between TNF and its cell-surface receptor.

503 Which one of the following specifically blocks Integrin- α_4 and prevents lymphocyte trafficking to the intestine in IBD ?

Harrison's 18th Ed. 2492

- A. Anti IL-12 P40 antibody
- B. Anti gamma interferon
- C. Natalizumab
- D. Basiliximab

Humanized monoclonal antibody to alpha-4 integrin - Natalizumab inhibits lymphocyte trafficking and is effective in treatment of moderate to severely active CD who have had an inadequate response or are unable tolerate conventional CD therapies and anti-TNF monoclonal antibody therapy.

504 Natalizumab is a ?

Harrison's 18th Ed. 2492

- A. IgG₁ chimeric monoclonal antibody against TNF
- B. IgG₁ recombinant human monoclonal antibody against TNF
- C. IgG₄ recombinant humanized immunoglobulin G4 antibody against α_4 integrin
- D. P75 TNF receptor fusion protein

Natalizumab is a recombinant humanized immunoglobulin G4 antibody against α_4 integrin that is effective in the induction and maintenance of remission in CD patients.

505 Natalizumab causes progressive multifocal leukoencephalopathy (PML) by reactivation of which virus ?

Harrison's 18th Ed. 2492, Am J Gastroenterol 2009; 104:465.483

- A. Hepatitis B
- B. Human JC polyoma virus
- C. Hepatitis C
- D. Cytomegalovirus (CMV)

Natalizumab reactivates the human JC polyoma virus, which can lead to progressive multifocal leukoencephalopathy (PML).

506 Which one of the following helps in intestinal restitution and repair ?

Harrison's 16th Ed. 1747

- A. TNF
- B. EGF
- C. GM-CSF
- D. IL-12

507 Which of the following is false in females with IBD ?*Harrison's 18th Ed. 2494*

- A. Normal fertility rates in quiescent IBD
- B. Fallopian tubes scarred by inflammatory process of CD, especially on right side
- C. Fallopian tubes scarred by inflammatory process of CD, especially on left side
- D. Dyspareunia common

Fallopian tubes can be scarred by inflammatory process of CD, especially on right side because of the proximity of terminal ileum.

508 In IBD, which of following drugs is safe for use in pregnancy ?*Harrison's 18th Ed. 2494*

- A. Sulfasalazine
- B. Mesalamine
- C. Balsalazide
- D. All of the above

Sulfasalazine, mesalamine, and balsalazide are safe for use in pregnancy and nursing, but additional folate supplementation must be given with sulfasalazine. Topical 5-ASA agents are also safe during pregnancy and nursing. Glucocorticoids are generally safe for use during pregnancy.

509 The safe antibiotics to use for short periods in pregnant CD patients are all except ?*Harrison's 18th Ed. 2494*

- A. Ampicillin
- B. Cephalosporin
- C. Ciprofloxacin
- D. Metronidazole

Safest antibiotics in CD in pregnancy for weeks, not months are ampicillin and cephalosporin. Metronidazole can be used in the second or third trimester. Ciprofloxacin causes cartilage lesions and should be avoided.

510 In treatment of IBD with pregnancy, which of the following drugs is contraindicated ?*Harrison's 18th Ed. 2494*

- A. 6-Mercaptopurine
- B. Azathioprine
- C. Methotrexate
- D. Cyclosporine

Methotrexate is contraindicated in pregnancy and nursing. 6-MP and azathioprine pose minimal or no risk during pregnancy. In severe IBD treated with IV CSA during pregnancy, 80% of pregnancies were successfully completed without development of renal toxicity, congenital malformations, or developmental defects.

511 In pregnancy, exacerbation in Crohn's disease is seen in ?*Harrison's 16th Ed. 36*

- A. First trimester
- B. Second and third trimesters
- C. Postpartum period
- D. All of the above

512 In pregnancy, exacerbation in Ulcerative colitis is seen in ?*Harrison's 16th Ed. 36*

- A. First trimester
- B. Second trimester
- C. Third trimester
- D. All of the above

Patients should be in remission for 6 months before conceiving. Most CD patients can deliver vaginally, but cesarean section may be the preferred route of delivery for patients with anorectal and perirectal abscesses and fistulas to reduce the likelihood of fistulas developing or extending into the episiotomy scar.

513 Patients with CD have an increased risk of developing which of the following cancers ?*Harrison's 18th Ed. 2495*

- A. Non-Hodgkin's lymphoma
- B. Hodgkin's lymphoma
- C. Bronchogenic carcinoma
- D. Carcinoma cervix

514 Patients with CD have an increased risk of developing which of the following cancers ?*Harrison's 18th Ed. 2495*

- A. Hodgkin's lymphoma
- B. Endometrial carcinoma
- C. Bronchogenic carcinoma
- D. Squamous cell cancers

Patients with CD may have an increased risk of non-Hodgkin's lymphoma, leukemia, and myelodysplastic syndromes. Severe chronic, complicated perianal disease in CD patients may be associated with an increased risk of cancer in lower rectum and anal canal (squamous cell cancers).

515 Invariably involved site in UC is ?*Harrison's 17th Ed. 1888*

- A. Sigmoid colon
- B. Transverse colon
- C. Ileum
- D. Rectum

516 Which site is usually spared in CD ?*Harrison's 17th Ed. 1888*

- A. Sigmoid colon
- B. Transverse colon
- C. Ileum
- D. Rectum

In UC rectum is almost always involved. Rectum is often spared in CD.

517 Most common site of involvement in CD is ?*Harrison's 17th Ed. 1888*

- A. Sigmoid colon
- B. Transverse colon
- C. Ileum
- D. Rectum

CD can affect any part of the gastrointestinal tract, from mouth to anus. In 75% of patients with small-intestinal disease, terminal ileum is involved in 90%.

518 Perforation in CD is mainly seen in ?*Harrison's 17th Ed. 1891*

- A. Sigmoid colon
- B. Transverse colon
- C. Ileum
- D. Rectum

In CD, perforation occurs in 1 - 2% of patients usually in the ileum, but occasionally in jejunum or as a complication of toxic megacolon.

- 519 Before making a diagnosis of IBD, which of the following infections should be ruled out ?

Harrison's 17th Ed. 967

- A. Campylobacter
- B. Arcobacter
- C. Helicobacter
- D. All of the above

Presentation of Campylobacter enteritis may mimic UC or CD. As Campylobacter enteritis is much more common than UC and CD among young adults, a diagnosis of IBD should not be made until Campylobacter infection has been ruled out.

- 520 Which virus is a predisposing factor for IBD ?

Harrison's 16th Ed. 1777

- A. Paramyxovirus
- B. Orthomyxovirus
- C. Arbovirus
- D. Hepatitis A

- 521 Diarrhoea in CD is due to ?

Harrison's 17th Ed. 1890

- A. Bacterial overgrowth
- B. Bile acid malabsorption
- C. Increased electrolyte secretion in bowels
- D. All of the above

Diarrhea in CD is caused by bacterial overgrowth in obstructive stasis or fistulization, bile acid malabsorption due to a diseased or resected terminal ileum and intestinal inflammation with decreased water absorption & increased secretion of electrolytes.

- 522 Which of the following is false for colitis-associated colon cancer (CAC) ?

Harrison's 16th Ed. 1788

- A. CACs arise from an adenomatous polyp
- B. Mean age of CAC is in thirties
- C. CAC is distributed uniformly throughout colon
- D. APC gene mutations occur much later in CAC than sporadic colon cancer (SCC)

- 523 Ulcerative colitis can be a complication of ?

Harrison's 16th Ed. 980

- A. Primary syphilis
- B. Secondary syphilis
- C. Tertiary syphilis
- D. All of the abovesyphilis

- 524 Antihypertensive drug that can produce acute ulcerative colitis is ?

Harrison's 16th Ed. 1473, Table 230-8

- A. Minoxidil
- B. Methyldopa
- C. Labetolol
- D. Captopril

- 525 Which of the following tumour associated proteins can be found in ulcerative colitis ?

Harrison's 17th Ed. 483, Table 77-5

- A. CA125
- B. CD25

- C. CA 19-9
- D. CD30

- 526 Gastrointestinal / liver diseases that can produce interstitial lung disease include ?

Harrison's 16th Ed. 1555

- A. Crohn's disease / ulcerative colitis
- B. Primary biliary cirrhosis
- C. Chronic active hepatitis
- D. All of the above

Chapter 296. Irritable Bowel Syndrome

- 527 Which of the following is a criteria for the diagnosis of Irritable Bowel Syndrome (IBS) ?

Harrison's 18th Ed. 2496

- A. Paris
- B. Rome
- C. Helsinki
- D. Warsaw

Rome II criteria is useful for the diagnosis of IBS.

- 528 Which of the following is not included in the Rome II criteria for the diagnosis of IBS ?

Harrison's 18th Ed. 2496

- A. Improvement of abdominal pain/discomfort with defecation
- B. Painless diarrhea or constipation
- C. Onset associated with a change in frequency of stool
- D. Onset associated with a change in form of stool

Rome II diagnostic criteria for IBS includes recurrent abdominal pain or discomfort at least 3 days per month in the last 3 months associated with two or more of the following improvement with defecation, onset associated with a change in frequency of stool and onset associated with a change in form or appearance of stool.

- 529 Which of the following about abdominal pain in IBS is false ?

Harrison's 18th Ed. 2496

- A. Sleep deprivation is usual
- B. Exacerbated by eating
- C. Improved by passage of flatus or stools
- D. Worsens during the premenstrual & menstrual phases

Sleep deprivation is unusual.

- 530 Which of the following about diarrhea in IBS is false ?

Harrison's 18th Ed. 2496

- A. Small volume
- B. Nocturnal
- C. Aggravated by emotional stress
- D. Aggravated by eating

Nocturnal diarrhea or steatorrheal stools do not occur in IBS and malabsorption or weight loss does not occur. Stool volume >200 - 300 mL/day argues against IBS.

- 531 Microbe involved in the initial infection of post-infectious IBS is ?

Harrison's 18th Ed. 2498

- A. Campylobacter

- B. Salmonella
- C. Shigella
- D. All of the above

Microbes involved in the initial infection of post-infectious IBS are Campylobacter, Salmonella, and Shigella.

532 Which of the following argue against the diagnosis of IBS ?

Harrison's 18th Ed. 2498

- A. Appearance for the first time in old age
- B. Persistent diarrhea after a 48 hour fast
- C. Nocturnal diarrhea or steatorrheal stools
- D. All of the above

Appearance of the disorder for the first time in old age, progressive course from time of onset, persistent diarrhea after a 48-h fast, and presence of nocturnal diarrhea or steatorrheal stools argue against the diagnosis of IBS.

533 Painful constipation is a major complaint in which of the following ?

Harrison's 18th Ed. 2499

- A. Acute intermittent porphyria
- B. Hypothyroidism
- C. Hypoparathyroidism
- D. All of the above

Painful constipation is a major complaint in acute intermittent porphyria and lead poisoning.

534 Which of the following is an antidiarrheal agent ?

Harrison's 18th Ed. 2500

- A. Loperamide
- B. Paregoric
- C. Cholestyramine
- D. All of the above

535 Which of the following probiotics has shown significant benefit in IBS patients ?

Harrison's 18th Ed. 2500

- A. Faecalibacterium prausnitzii
- B. Lactobacillus
- C. Bifidobacterium infantis 35624
- D. Taenia suis

Probiotics naturally alter the gut flora. Bifidobacterium infantis 35624 showed significant improvement in the composite score for IBS.

536 Which of the following is a chloride channel activator ?

- A. Alosetron
- B. Rifaximin
- C. Tegaserod
- D. Lubiprostone

Lubiprostone is a bicyclic fatty acid that stimulates chloride channels in the apical membrane of intestinal epithelial cells. Chloride secretion induces passive movement of sodium & water into bowel lumen & improves bowel function in constipation-predominant IBS patients. Alosetron is a 5-HT₃ receptor antagonist. Rifaximin is a non-absorbed oral antibiotic. Tegaserod is a 5-HT₄ receptor agonists.

Chapter 298. Mesenteric Vascular Insufficiency

537 Which of the following is a category of intestinal ischemia ?

Harrison's 18th Ed. 2510

- A. Arterioocclusive mesenteric ischemia (AOMI)
- B. Nonocclusive mesenteric ischemia (NOMI)
- C. Mesenteric venous thrombosis (MVT)
- D. All of the above

538 Risk factors for acute intestinal arterial ischemia include ?

Harrison's 18th Ed. 2510

- A. Atrial fibrillation
- B. Recent myocardial infarction
- C. Valvular heart disease
- D. All of the above

Risk factors for acute intestinal arterial ischemia include atrial fibrillation, recent myocardial infarction, valvular heart disease, and recent cardiac or vascular catheterization.

539 Which of the following is a watershed area within the colonic blood supply and common location for intestinal ischemia ?

Harrison's 18th Ed. 2511

- A. Matsumoto point
- B. Griffiths' point
- C. Wyers point
- D. Mitchell point

540 Which of the following is a watershed area within the colonic blood supply and common location for intestinal ischemia ?

Harrison's 18th Ed. 2511

- A. Shih point
- B. Sudeck's point
- C. Hsu point
- D. Sise point

Collateral vessels within colon meet at splenic flexure & descending/sigmoid colon. These watershed areas are inherently at risk for decreased blood flow and are known as Griffiths' point and Sudeck's point respectively and are the most common locations for colonic ischemia.

541 Nationality of Jean Riolan was ?

- A. French
- B. German
- C. Spanish
- D. Portuguese

Arch of Riolan is named after Jean Riolan, French anatomist (1580 - 1657). It connects the proximal superior mesenteric artery (SMA) or one of its primary branches (middle colic artery) to the proximal inferior mesenteric artery (IMA) or one of its primary branches and runs close to the root of the mesentery.

542 Which of the following is associated with the best prognosis ?

Harrison's 18th Ed. 2513

- A. Arterioocclusive mesenteric ischemia (AOMI)
- B. Nonocclusive mesenteric ischemia (NOMI)
- C. Mesenteric venous thrombosis (MVT)
- D. All of the above

543 Which of the following is not a feature of chronic mesenteric angina ?

Harrison's 18th Ed. 2513

- A. Abdominal cramping & pain following ingestion of meal
- B. Weight loss
- C. Constipation
- D. Chronic diarrhea

Patients of chronic intestinal ischemia (intestinal angina) presents with abdominal cramping and pain following ingestion of a meal, weight loss and chronic diarrhea. Abdominal pain without weight loss is not chronic mesenteric angina.

544 The gold standard for confirmation of mesenteric arterial occlusion is ?

Harrison's 18th Ed. 2513

- A. Mesenteric angiography
- B. Duplex ultrasound
- C. Magnetic resonance angiography
- D. Abdominal spiral CT

Gold standard for confirmation of mesenteric arterial occlusion is mesenteric angiography. Duplex ultrasound evaluation of the mesenteric vessels is used as a screening test for patients with symptoms suggestive of chronic mesenteric ischemia.

301 - Approach to liver disease

545 The contribution of blood supply to liver from hepatic artery and portal vein is ?

Harrison's 18th Ed. 2520

- A. 50 % and 50 % respectively
- B. 40 % and 60 % respectively
- C. 60 % and 40 % respectively
- D. 20 % and 80 % respectively

Liver receives a dual blood supply, ~20% of blood flow is oxygen-rich blood from hepatic artery and 80% is nutrient-rich blood from the portal vein arising from stomach, intestines, pancreas & spleen.

546 Right lobe of liver is about how many times bigger than the left lobe ?

Diseases of liver & biliary system, Sheila Sherlock 9th Ed. 1

- A. 2 times
- B. 4 times
- C. 6 times
- D. 8 times

547 Pressure in the free hepatic vein is about ?

Diseases of liver & biliary system, Sheila Sherlock 9th Ed. 1

- A. 3 mm Hg
- B. 6 mm Hg
- C. 9 mm Hg
- D. 12 mm Hg

548 All are true regarding hepatic venous system except ?

Diseases of liver & biliary system, Sheila Sherlock 9th Ed. 1

- A. Hepatic venous blood in ~67% saturated with oxygen
- B. Hepatic venous blood is usually sterile
- C. Hepatic veins are seven in number
- D. Hepatic veins begin as zone 3 veins

549 Blood of caudate lobe of liver drains into ?

Diseases of liver & biliary system, Sheila Sherlock 9th Ed. 1

- A. Right hepatic vein
- B. Left hepatic vein
- C. Middle hepatic vein
- D. Inferior vena cava

550 Right & left lobes of liver are separated inferiorly by ?

Diseases of liver & biliary system, Sheila Sherlock 9th Ed. 1

- A. Falciform ligament
- B. Fissure for ligamentum venosum
- C. Fissure for ligamentum teres
- D. All of the above

The right and left lobes of liver are separated anteriorly by falciform ligament, posteriorly by fissure for ligamentum venosum and inferiorly by fissure for ligamentum teres.

551 Capacity of gall bladder is about ?

Diseases of liver & biliary system, Sheila Sherlock 9th Ed. 3

- A. 20 ml
- B. 30 ml
- C. 40 ml
- D. 50 ml

Gall bladder is a pear shaped bag, ~9 cm long with a capacity of about 50 ml.

552 Rokitansky-Aschoff sinuses are related to which of the following organs ?

Diseases of liver & biliary system, Sheila Sherlock 9th Ed. 4

- A. Liver
- B. Pancreas
- C. Gall bladder
- D. Intestine

Rokitansky-Aschoff sinuses are branching evaginations from the lumen into the mucosa and muscularis of the gall bladder.

553 Which of the following is not a cell type in liver ?

Harrison's 18th Ed. 2520

- A. Hepatocyte
- B. Rho cells
- C. Kupffer cells
- D. Ito cells

Hepatocytes constitute two-thirds of mass of liver. The remaining cell types are Kupffer cells (RE system), stellate (Ito or fat-storing) cells, endothelial cells and blood vessels, bile ductular cells and supporting structures.

554 Portal areas form which zone of the hepatic acinus ?

Harrison's 18th Ed. 2520

- A. Zone 1
- B. Zone 2
- C. Zone 3
- D. Zone 4

Functionally, liver is organized into acini. Hepatic arterial and portal venous blood enter acinus from portal areas (zone 1) and flow through the sinusoids to terminal hepatic veins (zone 3). Intervening hepatocytes constitute zone 2.

555 "Central veins" in liver are also called ?

Harrison's 18th Ed. 2520

- A. Terminal hepatic veins

- B. Terminal portal veins
- C. Terminal sinusoidal veins
- D. All of the above

Blood from portal areas is distributed through sinusoids, passing from zone 1 to zone 3 of acinus and draining into terminal hepatic veins ("central veins").

556 In hepatic acinus, secreted bile flows in the which of the following direction ?

Harrison's 18th Ed. 2520

- A. Zone 1 to zone 3
- B. Zone 3 to zone 1
- C. Zone 1 to zone 2
- D. Zone 2 to zone 1

In hepatic acinus, secreted bile flows in the in a countercurrent pattern from zone 3 to zone 1.

557 Kupffer cells are best described as ?

Harrison's 18th Ed. 2520

- A. Peripheral T lymphocytes
- B. Circulating B lymphocytes
- C. Fixed macrophages
- D. None of the above

Kupffer cells lie within sinusoidal vascular space & represent largest group of fixed macrophages in the body.

558 Hepatocytes produce which of the following ?

Harrison's 18th Ed. 2520

- A. Cholesterol
- B. Lecithin
- C. Phospholipids
- D. All of the above

Hepatocytes produce bile and its carriers i.e. bile acids, cholesterol, lecithin, phospholipids.

559 Which out of the following is the more liver-specific symptom ?

Harrison's 18th Ed. 2522

- A. Nausea
- B. Bloating
- C. Poor appetite
- D. Malaise

Constitutional symptoms of liver disease include fatigue, weakness, nausea, poor appetite, and malaise. More liver-specific symptoms include jaundice, dark urine, light stools, itching, abdominal pain, and bloating.

560 Most common & most characteristic symptom of liver disease is ?

Harrison's 18th Ed. 2522

- A. Fatigue
- B. Nausea
- C. Poor appetite
- D. Itching

Fatigue is the most common & most characteristic symptom of liver disease. It typically arises after activity or exercise & is rarely present or severe in the morning after adequate rest. Fatigue in liver disease is often intermittent and variable in severity from hour to hour and day to day.

561 Severe right upper quadrant pain ("liver pain") is most typical of all except ?

Harrison's 18th Ed. 2522

- A. Gallbladder disease

- B. Liver abscess
- C. Severe venoocclusive disease
- D. Acute hepatitis.

Right upper quadrant severe pain is most typical of gallbladder disease, liver abscess, and severe venoocclusive disease but is an occasional accompaniment of acute hepatitis.

562 Which of the following is the most reliable marker of severity of liver disease ?

Harrison's 18th Ed. 2522

- A. Jaundice
- B. Serum Albumin
- C. Prothrombin time
- D. Hepatic enzymes

Jaundice is the hallmark symptom of liver disease & perhaps the most reliable marker of severity.

563 Jaundice without dark urine indicates which of the following ?

Harrison's 18th Ed. 2522

- A. Hemolytic anemia
- B. Gilbert's syndrome
- C. Crigler-Najjar syndrome
- D. All of the above

Jaundice without dark urine indicates indirect (unconjugated) hyperbilirubinemia and is typical of hemolytic anemia, Gilbert's syndrome and Crigler-Najjar syndrome.

564 In Gilbert's syndrome, jaundice is more noticeable after which of the following ?

Harrison's 18th Ed. 2522

- A. Fasting
- B. Overnight sleep
- C. Exposure to sun
- D. All of the above

In Gilbert's syndrome, jaundice is more noticeable after fasting and with stress.

565 Which of the following statements about hepatitis C is false ?

Harrison's 18th Ed. 2522

- A. Sexual exposure is a rare mode of spread
- B. Maternal-infant transmission occurs
- C. No means of prevention of vertical spread
- D. None of the above

Vertical spread of hepatitis C occurs uncommonly. Sexual exposure is a common mode of spread of hepatitis B and hepatitis C.

566 Single most common risk factor for hepatitis C is ?

Harrison's 18th Ed. 2522

- A. Blood transfusion
- B. Injection drug use
- C. Maternal-infant transmission
- D. Sexual exposure

Injection drug use is now the single most common risk factor for hepatitis C.

567 What quantity of alcohol consumption per day is associated with an increased rate of alcoholic liver disease in men ?

Harrison's 18th Ed. 2522

- A. 10 to 25 grams
- B. 25 to 33 grams

- C. 33 to 45 grams
D. 45 to 62 grams

Alcohol consumption associated with an increased rate of alcoholic liver disease is probably more than 22 to 30 gram per day in women and 33 to 45 gram in men.

568 CAGE questionnaire is used for ?

Harrison's 18th Ed. 2523

- A. Sexual behaviour
B. Cigarette smoking
C. Alcohol dependence & abuse
D. None of the above

One "yes" response of the four questions in CAGE questionnaire should raise suspicion of an alcohol use problem, and more than one is a strong indication that alcohol abuse or dependence exists.

569 In CAGE questionnaire, "C" refers to ?

Harrison's 18th Ed. 2523, Table 301-2

- A. Continuous
B. Cut
C. Craving
D. Constant

C = Cut, A = Annoyed, G = Guilty, E = Eyeopener. One "yes" response should raise suspicion of an alcohol use problem, and more than one is a strong indication that abuse or dependence exists.

570 Which of the following is an inherited liver disease ?

Harrison's 18th Ed. 2523

- A. Wilson's disease
B. Hemochromatosis
C. α 1 antitrypsin (α 1AT) deficiency
D. All of the above

571 Which of the following is an inherited pediatric liver disease ?

Harrison's 18th Ed. 2523

- A. Familial intrahepatic cholestasis
B. Benign recurrent intrahepatic cholestasis
C. Alagille syndrome
D. All of the above

572 Which of the following statements is false ?

Harrison's 18th Ed. 2523

- A. Muscle wasting is a sign of advanced liver disease
B. Palmar erythema occur in acute liver disease
C. Jaundice may be detectable with S. bilirubin <2.5 mg/dL
D. None of the above

Signs of advanced liver disease include muscle wasting, ascites, edema, bruising, dilated abdominal veins, hepatic fetor, asterixis, mental confusion, stupor, and coma. During recovery phase, jaundice may be detectable with S. bilirubin <2.5 mg/dL. Spider angioma & palmar erythema occur in both acute & chronic liver disease.

573 Which of the following about spider angioma is false ?

Harrison's 18th Ed. 2523

- A. Occur in acute & chronic liver disease
B. Occur during pregnancy
C. Occur only on arms, face & upper torso
D. None of the above

Spider angioma occur only on the arms, face, and upper torso. Spider angioma and palmar erythema occur in both acute and chronic liver disease and are prominent in cirrhosis, but they can occur in normal individuals and are frequently present during pregnancy.

574 The nature of vessel involved in spider angioma is ?

Harrison's 18th Ed. 2523

- A. Artery
B. Arteriole
C. Vein
D. Capillary

Spider angioma are superficial, tortuous arterioles & fill from center outwards & can be pulsatile.

575 Most reliable physical finding in examining the liver is ?

Harrison's 18th Ed. 2523

- A. Size
B. Shape
C. Tenderness
D. Liver edge

Most reliable physical finding in examining the liver is hepatic tenderness.

576 Which of the following is a test of mental status in hepatic encephalopathy ?

Harrison's 18th Ed. 2523

- A. Trail-making test
B. Comparison of signatures
C. Drawing abstract objects
D. All of the above

Mental status examination for hepatic encephalopathy include trail-making test, drawing abstract objects or comparison of a signature to previous ones.

577 Which of the following is false about trail-making test ?

Harrison's 18th Ed. 2523

- A. Series of 10 numbered circles
B. Normal time for connect-the-dot test is 15-30 seconds
C. Considerable delay means early hepatic encephalopathy
D. None of the above

Mental status examination by trail-making test consists of a series of 25 numbered circles that the patient is asked to connect as rapidly as possible using a pencil. Normal range for connect-the-dot test is 15-30 seconds. Delay means early hepatic encephalopathy.

578 Which of the following is not a feature of hepatopulmonary syndrome ?

Harrison's 18th Ed. 2524

- A. Hypoxemia
B. Pulmonary arteriovenous shunting
C. Orthodeoxia
D. Hypercarbia

Hepatopulmonary syndrome is defined by the triad of liver disease, hypoxemia and pulmonary arteriovenous shunting. It is characterized by platypnea and orthodeoxia, representing shortness of breath and oxygen desaturation that occur upon assuming an upright position.

579 Slate-gray pigmentation to the skin also occurs with ?

Harrison's 18th Ed. 2524

- A. Primary biliary cirrhosis
B. Sclerosing cholangitis
C. Xanthelasma
D. Hemochromatosis

A slate-gray pigmentation of the skin occurs in hemochromatosis, if iron levels are high for a prolonged period.

580 Mucocutaneous vasculitis with palpable purpura is typical of ?*Harrison's 18th Ed. 2524*

- A. Primary biliary cirrhosis
- B. Primary hepatocellular carcinoma
- C. Cryoglobulinemia of chronic hepatitis C
- D. Wilsons disease

Mucocutaneous vasculitis with palpable purpura on lower extremities is typical of cryoglobulinemia of chronic hepatitis C.

581 Kayser-Fleischer rings are a finding in ?*Harrison's 18th Ed. 2524*

- A. Primary biliary cirrhosis
- B. Primary hepatocellular carcinoma
- C. Wilson's disease
- D. Hemochromatosis

Kayser-Fleischer rings occur in Wilson's disease also called hepatolenticular degeneration/ Westphal-Strumpell disease/Westphal pseudoscleriosis. Bernhard Kayser and Bruno Fleischer were German ophthalmologists.

582 Which of the following statements about Kayser-Fleischer ring is false ?*Br J Ophthalmol 2002;86:114*

- A. Found in 95% of patients of Wilson's disease
- B. All patients with KF rings have neurological manifestations
- C. Density of a KF ring correlates with severity of Wilson's disease
- D. None of the above

K-F-like ring has been reported in many other conditions like cryptogenic cirrhosis, chronic active hepatitis, neonatal hepatitis, primary biliary cirrhosis, cholestatic cirrhosis, hepatocellular disorders (when bilirubin rises acutely above 20mg/dl), alcoholic liver disease, galactosialidosis, schistosoma infection, multiple myeloma and intraocular foreign body containing copper.

583 The colour of Kayser-Fleischer ring is ?*Harrison's 18th Ed. 2524*

- A. Yellow-red
- B. Yellow-green
- C. Golden-brown
- D. Green-brown

Kayser-Fleischer rings consist of a golden-brown copper pigment deposited in Descemet's membrane at the periphery of the cornea - sclero-corneal junction. It may regress or disappear when systemic condition is well treated. It is usually bilateral & appears initially superiorly at 10 to 2 o'clock position, then inferiorly and later becomes circumferential.

584 Wilson's disease is due to defect in ?*Harrison's 18th Ed. 2524*

- A. ATP6B gene
- B. ATP7B gene
- C. ATP8B gene
- D. ATP9B gene

Wilson disease is an autosomal recessive disorder caused by mutations in the ATP7B gene, a membrane-bound copper-transporting ATPase. ATP7B facilitates the transfer of copper into Golgi apparatus where it combines with ceruloplasmin. Failure of this process leads to instability and decreased half life of ceruloplasmin and paradoxical ceruloplasmin deficiency. Free circulating copper accumulates in liver cytosol resulting in hepatocyte degeneration and cirrhosis. Other hepatic conditions as listed above that prevent elimination of copper, or intraocular foreign bodies containing copper, lead to elevated free copper concentrations and K-F ring.

585 Wilson's disease can produce a cataract described as ?*Harrison's 17th Ed. 2450*

- A. Christmas tree

- B. Palm tree
- C. Sunflower
- D. Rose flower

Sunflower cataracts & Kayser-Fleischer rings (copper deposits in the outer rim of cornea) are seen in Wilson's disease.

586 Testing for P-ANCA is for the diagnosis of which of the following ?*Harrison's 18th Ed. 2524, Table 301-3*

- A. Primary biliary cirrhosis
- B. Primary sclerosing cholangitis
- C. Autoimmune hepatitis
- D. Nonalcoholic steatohepatitis

587 Most common causes of chronic liver disease is ?*Harrison's 18th Ed. 2525*

- A. Chronic hepatitis C
- B. Alcoholic liver disease
- C. Chronic hepatitis B
- D. Autoimmune hepatitis

Most common causes of chronic liver disease in general order of frequency are chronic hepatitis C, alcoholic liver disease, nonalcoholic steatohepatitis, chronic hepatitis B, autoimmune hepatitis, sclerosing cholangitis, primary biliary cirrhosis, hemochromatosis, and Wilson disease.

588 ERCP is more valuable in evaluating which of the following ?*Harrison's 18th Ed. 2524*

- A. Pancreatitis
- B. Primary sclerosing cholangitis
- C. Choledocholithiasis
- D. Fatty liver

ERCP is more valuable in evaluating ampullary lesions and primary sclerosing cholangitis.

589 Which of the following is often the first indication of worsening fibrosis in liver cirrhosis ?*Harrison's 18th Ed. 2526*

- A. Mild elevations of bilirubin
- B. Prolongation of prothrombin time
- C. Slight decreases in serum albumin
- D. Mild thrombocytopenia

Noninvasive tests that suggest advanced liver fibrosis include mild elevations of bilirubin, prolongation of prothrombin time, slight decreases in serum albumin, and mild thrombocytopenia (which is often the first indication of worsening fibrosis).

590 Which of the following is not a factor in Child-Pugh classification of cirrhosis liver ?*Harrison's 18th Ed. 2526*

- A. Serum bilirubin
- B. SGPT
- C. Ascites
- D. Hepatic encephalopathy

Factors included in Child-Pugh classification of cirrhosis liver are serum bilirubin, serum albumin, prothrombin time, ascites & hepatic encephalopathy.

591 Child-Pugh score can predict which of the following ?*Harrison's 18th Ed. 2526*

- A. Bleeding from varices
- B. Spontaneous bacterial peritonitis

- C. Need for liver transplantation
- D. All of the above

Child-Pugh score is a reliable predictor of bleeding from varices, spontaneous bacterial peritonitis and need for liver transplantation.

592 Decompensation indicates cirrhosis with a Child-Pugh score of ?

Harrison's 18th Ed. 2526, Table 301-4

- A. 4
- B. 5
- C. 6
- D. 7

The Child-Pugh score is calculated by adding the scores of the five factors and can range from 5 to 15. Child-Pugh class is either A (a score of 5 to 6), B (7 to 9), or C (10 or above). Decompensation indicates cirrhosis with a Child-Pugh score of 7 or more (Class B).

593 MELD score is used for ?

Harrison's 18th Ed. 2526

- A. Assessing bleeding from varices
- B. Assessing hepatocellular carcinoma
- C. Assessing spontaneous bacterial peritonitis
- D. Assessing need for liver transplantation

Model for end-stage liver disease (MELD) score is used for assessing the need for liver transplantation.

594 Variables for calculation of MELD score include all except ?

Harrison's 18th Ed. 2526

- A. Prothrombin time
- B. Serum bilirubin
- C. B. urea
- D. Serum creatinine

MELD score is a prospectively derived scoring system calculated using three noninvasive variables - prothrombin time (INR), serum bilirubin and serum creatinine.

595 System similar to MELD used for children below the age of 12 is termed ?

Harrison's 18th Ed. 2526

- A. CELD
- B. SELD
- C. PELD
- D. KELD

System similar to MELD using bilirubin, INR, serum albumin, age, and nutritional status is used for children below the age of 12 is PELD.

302 - Evaluation of liver function

596 Which of the following liver function tests do not measure liver function at all ?

Harrison's 18th Ed. 2527

- A. S. Bilirubin
- B. S. Aminotransferases
- C. S. Albumin
- D. Prothrombin time

Aminotransferases or alkaline phosphatase do not measure liver function at all.

597 Isolated elevation of unconjugated bilirubin is seen in ?

Harrison's 18th Ed. 2527

- A. Hemolytic disorders
- B. Crigler-Najjar syndrome
- C. Gilbert's syndrome
- D. All of the above

Isolated elevation of unconjugated bilirubin is seen in hemolytic disorders, Crigler-Najjar & Gilbert's syndromes.

598 Which of the following about Gilbert's syndrome is false ?

Harrison's 18th Ed. 2527

- A. Healthy patient
- B. Isolated, unconjugated hyperbilirubinemia
- C. Absence of hemolysis
- D. None of the above

599 Which of the following is elevated in Gilbert's syndrome ?

Harrison's 18th Ed. 2530, Table 302-1

- A. Aminotransferases
- B. Alkaline phosphatase
- C. Prothrombin time
- D. None of the above

In Hemolysis/Gilbert's syndrome, aminotransferases, alkaline phosphatase, albumin and prothrombin time are normal. There is no bilirubinuria.

600 In isolated unconjugated hyperbilirubinemia, of the total bilirubin, the direct bilirubin is ?

Harrison's 18th Ed. 2527

- A. < 15 %
- B. < 20 %
- C. < 25 %
- D. < 30 %

In isolated unconjugated hyperbilirubinemia, serum bilirubin is elevated but direct bilirubin is <15%.

601 In liver disease, rate-limiting step in bilirubin metabolism is ?

Harrison's 18th Ed. 2527

- A. Entry of bilirubin in hepatocyte
- B. Conjugation of bilirubin in hepatocyte
- C. Transport of conjugated bilirubin into bile canaliculi
- D. All of the above

Rate-limiting step in bilirubin metabolism is not conjugation of bilirubin, but transport of conjugated bilirubin into the bile canaliculi.

602 Which of the following about liver functions is false ?

Harrison's 18th Ed. 2527

- A. Increased unconjugated bilirubin is rarely due to liver disease
- B. Conjugated hyperbilirubinemia almost always implies liver or biliary tract disease
- C. In most liver diseases, both conjugated & unconjugated bilirubin are elevated
- D. None of the above

603 Total serum bilirubin correlates with poor outcomes in ?

Harrison's 18th Ed. 2527

- A. Viral hepatitis

- B. Alcoholic hepatitis
- C. Drug-induced liver disease
- D. All of the above

Serum bilirubin serves as a prognostic marker in viral hepatitis, alcoholic hepatitisin MELD score, drug-induced liver disease indicates more severe injury.

604 Bilirubin found in urine is ?

Harrison's 18th Ed. 2527

- A. Unconjugated
- B. Conjugated
- C. Unconjugated + conjugated
- D. All of the above

Unconjugated bilirubin always binds to albumin in serum and is not filtered by kidney. Therefore, any bilirubin found in urine is conjugated bilirubin and bilirubinuria implies the presence of liver disease.

605 Which of the following may give a false-positive reading with Ictotest tablet ?

Harrison's 18th Ed. 2527

- A. Barbiturates
- B. Phenothiazines
- C. Antacids
- D. NSAID's

Phenothiazines may give a false-positive reading with Ictotest tablet.

606 Which of the following is true in patients recovering from jaundice ?

Harrison's 18th Ed. 2527

- A. Urine bilirubin clears prior to serum bilirubin
- B. Serum bilirubin clears prior to urine bilirubin
- C. Urine and serum bilirubin clear simultaneously
- D. Any of the above

In patients recovering from jaundice, the urine bilirubin clears prior to the serum bilirubin.

607 Which of the following play a role in detoxification of ammonia ?

Harrison's 18th Ed. 2527

- A. Spleen
- B. Pancreas
- C. Striated muscle
- D. Cartilage

Liver converts ammonia to urea which is excreted by kidneys. Striated muscles detoxify ammonia by combining it with glutamic acid to form glutamine.

608 Aspartate aminotransferase (AST) found in all except ?

Harrison's 18th Ed. 2528

- A. Skeletal muscle
- B. Kidneys
- C. Spleen
- D. Lungs

609 Aspartate aminotransferase (AST) not found in ?

Harrison's 18th Ed. 2528

- A. Leukocytes
- B. Erythrocytes
- C. Platelets
- D. All of the above

610 Least concentration of AST is in ?

Harrison's 18th Ed. 2528

- A. Brain
- B. Erythrocytes
- C. Lungs
- D. Pancreas

AST is found in liver, cardiac muscle, skeletal muscle, kidneys, brain, pancreas, lungs, leukocytes, & erythrocytes in decreasing order of concentration.

611 Elevation of aminotransferases to >1000 U/L occurs in which of the following disorders ?

Harrison's 18th Ed. 2529

- A. Viral hepatitis
- B. Ischemic liver injury
- C. Toxin or drug-induced liver injury
- D. All of the above

Aminotransferase levels of up to 300 U/L are nonspecific and may be found in any type of liver disorder. Aminotransferases levels of >1000 U/L occur in disorders associated with extensive hepatocellular injury like viral hepatitis, ischemic liver injury, and toxin or drug induced liver injury.

612 What AST:ALT ratio is highly suggestive of alcoholic liver disease ?

Harrison's 18th Ed. 2529

- A. > 1.5:1
- B. > 2:1
- C. > 2.5:1
- D. > 3:1

An AST:ALT ratio >2:1 is suggestive while a ratio >3:1 is highly suggestive of alcoholic liver disease.

613 Which of the following about alcoholic liver disease is false ?

Harrison's 18th Ed. 2529

- A. AST rarely > 300 U/L
- B. ALT often normal
- C. Increase in IgA levels
- D. None of the above

AST in alcoholic liver disease is rarely >300 U/L and ALT is often normal. Increases in IgA levels occur in alcoholic liver disease.

614 Which of the following about aminotransferases is false ?

Harrison's 18th Ed. 2529

- A. Aminotransferases are present in serum in low concentrations
- B. Liver cell necrosis not required for release of aminotransferases
- C. Absolute elevation of aminotransferases is of no prognostic significance in acute hepatocellular disorders
- D. None of the above

615 Low serum ALT in alcoholic liver disease is due to ?

Harrison's 18th Ed. 2529

- A. Deficiency of pyridoxal sulphate
- B. Deficiency of pyridoxal phosphate
- C. Deficiency of pyridoxal gluconate
- D. Deficiency of pyridoxal chloride

A low level of ALT in the serum is due to an alcohol-induced deficiency of pyridoxal phosphate.

616 Which of the following enzymes is elevated in cholestasis ?

Harrison's 18th Ed. 2529

- A. Alkaline phosphatase
- B. 5'-nucleotidase
- C. Gamma glutamyl transpeptidase (GGT)
- D. All of the above

Alkaline phosphatase, 5'-nucleotidase & GGT are usually elevated in cholestasis.

617 Which of the following is located in endoplasmic reticulum of hepatocytes ?

Harrison's 18th Ed. 2529

- A. Alkaline phosphatase
- B. 5'-nucleotidase
- C. Gamma glutamyl transpeptidase (GGT)
- D. All of the above

Alkaline phosphatase and 5'-nucleotidase are found in or near the bile canalicular membrane of hepatocytes, while GGT is located in the endoplasmic reticulum and in bile duct epithelial cells. Serum 5'-nucleotidase or GGT are rarely elevated in conditions other than liver disease.

618 Elevated heat-stable fraction of serum alkaline phosphatase suggests its origin from ?

Harrison's 18th Ed. 2529

- A. Liver
- B. Bone
- C. Placenta
- D. Intestine

Elevated heat-stable fraction of serum alkaline phosphatase strongly suggests its placental or tumor source. Bone alkaline phosphatase is most susceptible to inactivation by heat.

619 Individuals of which of the following blood group can have an elevation of serum alkaline phosphatase after eating a fatty meal ?

Harrison's 18th Ed. 2529

- A. A
- B. B
- C. AB
- D. All of the above

Individuals with blood types O & B can have an elevation of serum alkaline phosphatase after eating a fatty meal due to influx of intestinal alkaline phosphatase into the blood.

620 In cholestatic liver disorders, alkaline phosphatase elevations are how many times greater than normal ?

Harrison's 18th Ed. 2529

- A. 2 times
- B. 3 times
- C. 4 times
- D. None of the above

Alkaline phosphatase elevations greater than four times normal occur primarily in cholestatic liver disorders, infiltrative liver diseases and Paget's disease.

621 Conditions causing isolated elevations of serum alkaline phosphatase include all except ?

Harrison's 18th Ed. 2529

- A. Hodgkin's disease
- B. Inflammatory bowel disease
- C. Hypothyroidism

- D. Congestive heart failure

Isolated elevations of serum alkaline phosphatase is seen in Hodgkin's disease, diabetes, hyperthyroidism, CHF, amyloidosis and inflammatory bowel disease.

622 Serum albumin is synthesized by ?

Harrison's 18th Ed. 2529

- A. Hepatocyte
- B. Kidney
- C. Intestinal epithelial cells
- D. All of the above

Serum albumin is synthesized exclusively by hepatocytes.

623 Serum albumin has a half-life of ?

Harrison's 18th Ed. 2529

- A. 18 to 20 days
- B. 28 to 35 days
- C. 35 to 45 days
- D. > 60 days

624 What proportion of albumin is degraded per day ?

Harrison's 18th Ed. 2529

- A. 2 %
- B. 4 %
- C. 6 %
- D. 8 %

Serum albumin has a half-life of 18 to 20 days with approximately 4% degraded per day.

625 Albumin synthesis is inhibited by ?

Harrison's 18th Ed. 2529

- A. Serum interleukin 1
- B. Cholecystokinin
- C. Lipase
- D. All of the above

Prolonged increases in levels of serum cytokines IL-1 &/or tumor necrosis factor inhibit albumin synthesis.

626 Which of the following serum globulins is not produced by hepatocytes ?

Harrison's 18th Ed. 2530

- A. Alpha globulin
- B. Beta globulin
- C. Gamma globulin
- D. All of the above

Gamma globulins (immunoglobulins) are produced by B lymphocytes and alpha and beta globulins are produced in hepatocytes.

627 Which of the following statements is false ?

Harrison's 18th Ed. 2530

- A. Gamma globulins are increased in chronic liver disease
- B. IgG levels increase in autoimmune hepatitis
- C. IgM levels increase in primary biliary cirrhosis
- D. None of the above

In cirrhosis, increased serum gamma globulin concentration is due to increased synthesis of antibodies, some directed against intestinal bacteria because cirrhotic liver fails to clear bacterial antigens. Diffuse polyclonal increases in IgG levels are common in autoimmune hepatitis. Increases in IgM levels are common in primary biliary cirrhosis, while increases in IgA levels occur in alcoholic liver disease.

628 Which of the following blood clotting factors is not made by hepatocytes ?

Harrison's 18th Ed. 2530

- A. II
- B. V
- C. VIII
- D. X

With the exception of factor VIII (produced by vascular endothelial cells), blood clotting factors are made exclusively in hepatocytes.

629 Serum half-life of factor VII is ?

Harrison's 18th Ed. 2530

- A. 6 hours
- B. 24 hours
- C. 48 hours
- D. 72 hours

Serum half life of factor VII is 6 hours.

630 Serum half-life of fibrinogen is ?

Harrison's 18th Ed. 2530

- A. 2 days
- B. 3 days
- C. 5 days
- D. 7 days

Serum half life of fibrinogen is 5 days.

631 Serum prothrombin time does not measure which of the following factor ?

Harrison's 18th Ed. 2530

- A. II
- B. V
- C. IX
- D. X

Serum prothrombin time collectively measures factors II, V, VII and X.

632 Single best acute measure of hepatic synthetic function is ?

Harrison's 18th Ed. 2530

- A. Serum albumin
- B. Serum globulins
- C. Clotting factors
- D. Serum bilirubin

Because of their rapid turnover, measurement of the clotting factors is the single best acute measure of hepatic synthetic function.

633 Biosynthesis of factors which of the following factors depends on vitamin K ?

Harrison's 18th Ed. 2530

- A. II
- B. IX
- C. X
- D. All of the above

Biosynthesis of factors II, VII, IX, and X depends on vitamin K.

303 - Hyperbilirubinemias

634 What proportion of bilirubin is derived from degradation of the hemoglobin of senescent red blood cells ?

Harrison's 18th Ed. 2531

- A. ~ 30 - 50 %
- B. ~ 50 - 70 %
- C. ~ 70 - 90 %
- D. ~ 100 %

About 70 - 90% of bilirubin is derived from degradation of the hemoglobin of senescent red blood cells.

635 Glutathione-S-transferase is related to which of the following steps in bilirubin metabolism ?

Harrison's 18th Ed. 2531

- A. Hepatocellular uptake
- B. Intracellular binding
- C. Conjugation
- D. Biliary excretion

After hepatocellular uptake, bilirubin is kept in solution by binding to glutathione-S-transferases formerly called ligandins.

636 Bilirubin-UDP-glucuronosyltransferase is related to which of the following steps in bilirubin metabolism ?

Harrison's 18th Ed. 2531

- A. Hepatocellular uptake
- B. Intracellular binding
- C. Conjugation
- D. Biliary excretion

Bilirubin is conjugated with one or two glucuronic acid moieties by a specific UDP-glucuronosyltransferase to form bilirubin mono- and diglucuronide, respectively.

637 Aqueous insolubility of bilirubin is due to which of the following ?

Harrison's 18th Ed. 2531

- A. Internal phosphate bonding
- B. Internal hydrogen bonding
- C. Internal sulphate bonding
- D. All of the above

Conjugation of bilirubin with glucuronic acid moieties disrupts internal hydrogen bonding that limits aqueous solubility of bilirubin & the resulting glucuronide conjugates are highly soluble in water.

638 UDP-glucuronosyltransferases (UGT) that conjugate bilirubin belong to which UGT family ?

Harrison's 18th Ed. 2532

- A. UGT1
- B. UGT2
- C. UGT3
- D. UGT4

UDP-glucuronosyltransferases (UGT) that conjugate bilirubin belong to the UGT1 family. Exon A1 and the four common exons, collectively designated the UGT1A1 gene, encode the physiologically critical enzyme bilirubin-UDP-glucuronosyltransferase (UGT1A1).

639 Human UGT1 gene complex is on which of the following chromosomes ?

Harrison's 18th Ed. 2532, Figure 303-2

- A. 2

- B. 4
- C. 6
- D. 8

Human UGT1 gene complex is on chromosome 2. It contains at least 13 substrate-specific first exons (A1, A2, etc.). Since four of these are pseudogenes, nine UGT1 isoforms with differing substrate specificities are expressed. Mutations in a first exon affect only a single isoform. Those in exons 2 - 5 affect all enzymes encoded by the UGT1 complex.

640 Multidrug resistance - associated protein 2 (MRP2) is related to which of the following steps in bilirubin metabolism ?

Harrison's 18th Ed. 2532

- A. Hepatocellular uptake
- B. Intracellular binding
- C. Conjugation
- D. Biliary excretion

Bilirubin mono- and diglucuronides are excreted across canalicular plasma membrane into bile canaliculus by ATP-dependent transport process mediated by a canalicular membrane protein called multidrug resistance-associated protein 2 (MRP2). Mutations of MRP2 result in Dubin-Johnson syndrome.

641 Which of the following is false about urobilinogen ?

Harrison's 18th Ed. 2532

- A. Made from unconjugated bilirubin in gut
- B. Water-soluble
- C. Colorless
- D. Undergoes enterohepatic cycling

"Conjugated bilirubin" is converted by bacterial metabolism in gut to water-soluble colorless urobilinogen. Urobilinogen undergoes enterohepatic cycling. Urobilinogen not taken up by liver reaches systemic circulation, from which some is cleared by kidneys.

642 Which of the following interrupts bilirubin enterohepatic cycling ?

Harrison's 18th Ed. 2532

- A. Aluminum hydroxide
- B. Magnesium sulphate
- C. Calcium phosphate
- D. Calcium carbonate

Oral administration of calcium phosphate with or without the lipase inhibitor orlistat may be an efficient means to interrupt bilirubin enterohepatic cycling.

643 In response to hemolytic stress, bone marrow is capable of increasing erythrocyte production by ?

Harrison's 18th Ed. 2532

- A. Two fold
- B. Four fold
- C. Six fold
- D. Eight fold

In response to hemolytic stress, bone marrow is capable of a sustained eight fold increase in erythrocyte production.

644 Hemolysis alone cannot result in a sustained hyperbilirubinemia of more than ?

Harrison's 18th Ed. 2532

- A. ~2 mg/dL
- B. ~4 mg/dL
- C. ~6 mg/dL
- D. ~8 mg/dL

Hemolysis alone cannot result in a sustained hyperbilirubinemia of more than ~ 4 mg/dL.

645 Direct-reacting fraction is how much of total serum bilirubin in isolated hemolysis ?

Harrison's 18th Ed. 2532

- A. <= 10 %
- B. <= 12 %
- C. <= 15 %
- D. <= 18 %

Hemolysis results in pure unconjugated hyperbilirubinemia, with direct-reacting fraction being <=15% of total serum bilirubin.

646 Ineffective erythropoiesis is seen in all except ?

Harrison's 18th Ed. 2532

- A. Thalassemia major
- B. Congenital erythropoietic porphyria
- C. Crigler-Najjar syndrome
- D. Lead poisoning

In thalassemia major, megaloblastic anemias due to folate or vitamin B12 deficiency, congenital erythropoietic porphyria, lead poisoning, and congenital & acquired dyserythropoietic anemias, the fraction of total bilirubin production derived from ineffective erythropoiesis is increased, reaching as much as 70% of the total producing modest degrees of unconjugated hyperbilirubinemia.

647 Which of the following produces hyperbilirubinemia due to decreased hepatic bilirubin uptake ?

Harrison's 18th Ed. 2533

- A. Pregnanediol
- B. Chloramphenicol
- C. Gentamicin
- D. Cholecystographic contrast agents

Apart from Gilbert's syndrome, flavaspidic acid, novobiocin, rifampin and cholecystographic contrast agents produce defects in bilirubin uptake. Pregnanediol, novobiocin, chloramphenicol, and gentamicin produce unconjugated hyperbilirubinemia by inhibiting UGT1A1 activity.

648 Fetal bilirubin is cleared by ?

Harrison's 18th Ed. 2533

- A. Fetal liver
- B. Fetal kidney
- C. Placenta
- D. All of the above

Bilirubin produced by the fetus is cleared by the placenta and eliminated by the maternal liver.

649 Most neonates develop mild unconjugated hyperbilirubinemia between days ?

Harrison's 18th Ed. 2533

- A. 1 and 3 after birth
- B. 2 and 5 after birth
- C. 5 and 7 after birth
- D. 7 and 10 after birth

Immediately after birth, due to incompletely developed hepatic physiologic processes like low levels of UGT1A1, undeveloped intestinal flora that convert bilirubin to urobilinogen, most neonates develop mild unconjugated hyperbilirubinemia between days 2 and 5 after birth.

650 What are the peak levels of physiologic neonatal jaundice ?

Harrison's 18th Ed. 2533

- A. 3 - 5 mg/dL
- B. 5 - 10 mg/dL
- C. 10 - 15 mg/dL

- D. 15 - 20 mg/dL

Peak levels of physiologic neonatal jaundice are typically 5 - 10 mg/dL.

651 Bilirubin levels of physiologic neonatal jaundice return to normal adult concentrations within ?

Harrison's 18th Ed. 2533

- A. 1 week
- B. 2 weeks
- C. 3 weeks
- D. 4 weeks

Bilirubin levels of physiologic neonatal jaundice return to normal adult concentrations within 2 weeks as mechanisms required for bilirubin disposition mature.

652 Which of the following is false for bilirubin encephalopathy, or kernicterus ?

Harrison's 18th Ed. 2533

- A. Rapidly rising unconjugated bilirubin concentration
- B. Immature blood-brain barrier
- C. Deposition in the basal ganglia
- D. None of the above

A rapidly rising unconjugated bilirubin concentration, or absolute levels >20 mg/dL, exposed the infant to the at risk of bilirubin encephalopathy, or kernicterus.

653 Which of the following drugs may produce unconjugated hyperbilirubinemia by inhibiting UGT1A1 activity ?

Harrison's 18th Ed. 2533

- A. Pregnanediol
- B. Chloramphenicol
- C. Gentamicin
- D. All of the above

Pregnanediol, novobiocin, chloramphenicol, and gentamicin may produce unconjugated hyperbilirubinemia by inhibiting UGT1A1 activity.

654 'Breast milk jaundice' in neonates is due to presence of what in breast milk ?

Harrison's 18th Ed. 2533

- A. Immunoglobulins
- B. Proteins
- C. Fatty acids
- D. Carbohydrates

Bilirubin conjugation may be inhibited by certain fatty acids that are present in breast milk but not serum of mothers whose infants have excessive neonatal hyperbilirubinemia (breast milk jaundice).

655 Lucey-Driscoll syndrome is related to ?

Harrison's 18th Ed. 2533

- A. UGT1A1 inhibitor in breast milk
- B. UGT1A1 inhibitor in maternal serum
- C. Low UGT1A1 levels at birth
- D. All of the above

In transient familial neonatal hyperbilirubinemia (Lucey-Driscoll syndrome) there is a UGT1A1 inhibitor in maternal serum.

656 Which of the following about Crigler-Najjar Syndrome, Type I is false ?

Harrison's 18th Ed. 2534

- A. Unconjugated hyperbilirubinemia of ~ 20 - 45 mg/dL

- B. Appears in the neonatal period
- C. Persists for life
- D. Bilirubin is found in the urine

No bilirubin is found in the urine.

657 Which of the following about Crigler-Najjar Syndrome, Type I is false ?

Harrison's 18th Ed. 2534

- A. Normal serum aminotransferases
- B. Normal alkaline phosphatase
- C. No evidence of hemolysis
- D. None of the above

658 Which of the following is false about Crigler-Najjar Syndrome Type I ?

Harrison's 18th Ed. 2534

- A. Unconjugated hyperbilirubinemia
- B. Absent UGT1A1 activity in liver
- C. Kernicterus common
- D. Responds to phenobarbital

Crigler-Najjar Syndrome, Type I (CN-I) is characterized by unconjugated hyperbilirubinemia of ~20 to 45 mg/dL that appears in neonatal period and persists for life. Bilirubin glucuronides are absent from bile and there is expression of UGT1A1 activity in hepatic tissue. There is no response to phenobarbital or any enzyme inducer.

659 Causative mutation is in the bilirubin-specific exon A1 of which variety of Crigler-Najjar Syndrome Type I ?

Harrison's 18th Ed. 2534

- A. Crigler-Najjar Syndrome Type IA
- B. Crigler-Najjar Syndrome Type IB
- C. Crigler-Najjar Syndrome Type IC
- D. Crigler-Najjar Syndrome Type ID

In Crigler-Najjar Syndrome Type IB, the defect is limited to bilirubin conjugation, and the causative mutation is in the bilirubin-specific exon A1.

660 Which of the following is false about Crigler-Najjar Syndrome Type I ?

Harrison's 18th Ed. 2534

- A. Rare (estimated prevalence = 0.6 - 1.0 per million)
- B. Autosomal recessive pattern of inheritance
- C. Estrogen glucuronidation is defective
- D. Liver transplantation not helpful

In Crigler-Najjar Syndrome Type I, early liver transplantation remains the best hope to prevent brain injury and death.

661 Crigler-Najjar Syndrome Type I (CN-I) differs from Crigler-Najjar Syndrome, Type II (CN-II) in which of the following ?

Harrison's 18th Ed. 2534

- A. Average bilirubin concentrations are lower in CN-II
- B. CN-II is infrequently associated with kernicterus
- C. CN-II responds to phenobarbital
- D. All of the above

Crigler-Najjar Syndrome Type II (CN-II) is characterized by marked unconjugated hyperbilirubinemia with normal conventional hepatic biochemical tests, hepatic histology and no hemolysis. Average bilirubin concentrations are lower in CN-II. CN-II is infrequently associated with kernicterus. Bile in CN-II contains bilirubin glucuronides mostly monoglucuronides. UGT1A1 in liver is present at reduced levels in CN-II and bilirubin concentrations fall with phenobarbital therapy.

662 Which of the following is false about Gilbert's Syndrome ?

Harrison's 18th Ed. 2534

- A. Conjugated hyperbilirubinemia
- B. UGT1A1 activity - 10-35 % of normal
- C. Phenobarbital normalizes serum bilirubin
- D. Aggravated by alcohol use

In Gilbert's Syndrome, UGT1A1 activity is typically reduced to 10 - 35% of normal, and bile pigments exhibit a characteristic increase in bilirubin monoglucuronides.

663 Gilbert's Syndrome is a close clinical entity to which of the following ?

Harrison's 18th Ed. 2534

- A. Crigler-Najjar Syndrome Type I
- B. Crigler-Najjar Syndrome Type II
- C. Lucey-Driscoll syndrome
- D. Benign recurrent intrahepatic cholestasis (BRIC)

The clinical spectrum of Gilbert's Syndrome hyperbilirubinemia fades into that of CN-II at serum bilirubin concentrations of 5 - 8 mg/dL.

664 Which of the following drugs is glucuronidated specifically by bilirubin-UDP-glucuronosyltransferase ?

Harrison's 18th Ed. 2535

- A. Estradiol benzoate
- B. Acetaminophen
- C. Tolbutamide
- D. Irinotecan

In Gilbert's Syndrome, toxicity occurs upon administration of antitumor agent irinotecan (CPT-11) because its active metabolite (SN-38) is glucuronidated specifically by bilirubin-UDP-glucuronosyltransferase.

665 Which of the following drugs used in HIV patients inhibits UGT1A1 ?

Harrison's 18th Ed. 2535

- A. Zidovudine
- B. Indinavir
- C. Enfuvirtide
- D. All of the above

HIV protease inhibitors indinavir and atazanavir inhibit UGT1A1, resulting in hyperbilirubinemia that is most pronounced in patients with preexisting Gilbert's Syndrome.

666 Which of the following are examples of familial defects in hepatic excretory function ?

Harrison's 18th Ed. 2535

- A. Dubin-Johnson Syndrome
- B. Rotor Syndrome
- C. Benign Recurrent Intrahepatic Cholestasis
- D. All of the above

667 Which of the following does not manifest as predominantly conjugated hyperbilirubinemia ?

Harrison's 18th Ed. 2535

- A. Dubin-Johnson Syndrome
- B. Crigler-Najjar Syndrome
- C. Rotor Syndrome
- D. Benign Recurrent Intrahepatic Cholestasis

668 In Dubin-Johnson Syndrome, degree of hyperbilirubinemia may be increased by ?

Harrison's 18th Ed. 2535

- A. Intercurrent illness
- B. Oral contraceptive use
- C. Pregnancy
- D. All of the above

In Dubin-Johnson Syndrome, degree of hyperbilirubinemia may be increased by intercurrent illness, oral contraceptive use, and pregnancy.

669 Liver is grossly black in appearance in which of the following ?

Harrison's 18th Ed. 2535

- A. Dubin-Johnson syndrome
- B. Rotor syndrome
- C. Progressive familial intrahepatic cholestasis
- D. Benign recurrent intrahepatic cholestasis (BRIC)

In DJS, due to accumulation in lysosomes of centrilobular hepatocytes of dark, coarsely granular pigment, liver is grossly black in appearance. This pigment is thought to be derived from epinephrine metabolites that are not excreted normally.

670 Which of the following is false about Dubin-Johnson Syndrome ?

Harrison's 18th Ed. 2535

- A. Conjugated hyperbilirubinemia
- B. Bilirubinuria present
- C. Liver grossly black
- D. Pruritus common

DJS patients have normal serum & biliary bile acid concentrations & do not have pruritus.

671 Dark, coarsely granular pigment in hepatocytes in Dubin-Johnson Syndrome disappears during ?

Harrison's 18th Ed. 2535

- A. Enteric fever
- B. Viral hepatitis
- C. Malaria
- D. All of the above

Dark, coarsely granular pigment in hepatocytes in Dubin-Johnson Syndrome disappears during bouts of viral hepatitis, only to reaccumulate slowly after recovery.

672 Mutation in which of the following genes produce the Dubin-Johnson phenotype ?

Harrison's 18th Ed. 2536

- A. ABCC2
- B. NTCP
- C. MRP2
- D. FIC1

MRP2 is an ATP-dependent canalicular membrane transporter and mutations in the MRP2 gene produce the Dubin-Johnson phenotype, which has an autosomal recessive pattern of inheritance.

673 In urine from Dubin-Johnson Syndrome patients, which is the predominant coproporphyrin isomer ?

Harrison's 18th Ed. 2536

- A. Coproporphyrin isomer I
- B. Coproporphyrin isomer II
- C. Coproporphyrin isomer III
- D. Coproporphyrin isomer IV

Naturally occurring coproporphyrin isomers are I and III. Normally, 75% of the coproporphyrin in urine is isomer III. In urine from DJS patients, total coproporphyrin content is normal, but >80% of the total is isomer I.

674 Which of the following is an autosomal recessive disorder ?

Harrison's 18th Ed. 2536

- A. Crigler-Najjar Syndrome
- B. Gilbert's Syndrome
- C. Rotor Syndrome
- D. All of the above

675 Rotor Syndrome is clinically similar to ?

Harrison's 18th Ed. 2536

- A. Dubin-Johnson Syndrome
- B. Crigler-Najjar Syndrome
- C. Gilbert's Syndrome
- D. Lucey-Driscoll syndrome

Rotor Syndrome is a benign, autosomal recessive disorder clinically similar to DJS.

676 Which of the following is false about Rotor Syndrome ?

Harrison's 18th Ed. 2536

- A. Conjugated hyperbilirubinemia
- B. Gallbladder visualized on oral cholecystography
- C. Liver normal in appearance
- D. Total urinary coproporphyrin excretion normal

In Rotor syndrome, the gallbladder is visualized on oral cholecystography, in contrast to nonvisualization that is typical of DJS. Total urinary coproporphyrin excretion is substantially increased in Rotor syndrome, in contrast to the normal levels seen in DJS.

677 Which of the following is false about Benign Recurrent Intrahepatic Cholestasis (BRIC) ?

Harrison's 18th Ed. 2536

- A. Recurrent attacks of pruritus and jaundice
- B. Normal serum aminotransferase levels
- C. Elevations in alkaline phosphatase
- D. Does not lead to cirrhosis

BRIC is characterized by recurrent attacks of pruritus and jaundice. Laboratory findings include elevations in serum conjugated bilirubin, aminotransferase and alkaline phosphatase levels. BRIC is an autosomal recessive benign disorder in that it does not lead to cirrhosis or end-stage liver disease.

678 Mutation in which of the following genes produce the Benign Recurrent Intrahepatic Cholestasis (BRIC) ?

Harrison's 18th Ed. 2536

- A. ABCC2
- B. NTCP
- C. MRP2
- D. FIC1

Gene FIC1 is mutated in patients with BRIC.

679 Gene FIC1 is mainly expressed in ?

Harrison's 18th Ed. 2536

- A. Liver
- B. Small intestine
- C. Kidney
- D. Heart

Gene FIC1 is mainly expressed strongly in the small intestine but only weakly in the liver.

680 Byler disease is also known as ?

Harrison's 18th Ed. 2537

- A. Progressive Familial Intrahepatic Cholestasis type 1
- B. Progressive Familial Intrahepatic Cholestasis type 2
- C. Progressive Familial Intrahepatic Cholestasis type 3
- D. Progressive Familial Intrahepatic Cholestasis type 4

Byler disease is also termed as Progressive Familial Intrahepatic Cholestasis (FIC) type 1. This is also a consequence of an FIC1 mutation and may progress to malnutrition, growth retardation, and end-stage liver disease during childhood.

681 Mutation of MDR3 gene results in ?

Harrison's 18th Ed. 2537

- A. Progressive Familial Intrahepatic Cholestasis type 1
- B. Progressive Familial Intrahepatic Cholestasis type 2
- C. Progressive Familial Intrahepatic Cholestasis type 3
- D. Progressive Familial Intrahepatic Cholestasis type 4

Progressive FIC type 3 has been associated with a mutation of MDR3, a protein that is essential for normal hepatocellular excretion of phospholipids across the bile canaliculus.

304 - Acute viral hepatitis

682 World Hepatitis Day is observed on ?

- A. October 01
- B. December 01
- C. February 04
- D. May 19

World Hepatitis Day - May 19, World Hepatitis Awareness Day - October 01, World AIDS Day - December 1, World Cancer Day - February 04.

683 DANE particle is the name given to ?

- A. Hepatitis A virion
- B. Hepatitis B virion
- C. Hepatitis C virion
- D. Hepatitis D virion

D.S. Dane and others discovered the HBV virus particle in 1970 by electron microscopy.

684 Which of the following is not a RNA virus ?

Harrison's 18th Ed. 2537

- A. Hepatitis A virus
- B. Hepatitis B virus
- C. Hepatitis C virus
- D. Hepatitis D virus

A, C, D, E human hepatitis viruses are RNA viruses. Hepatitis B is a DNA virus.

685 Which of the following viruses is a DNA virus ?

Harrison's 18th Ed. 2537

- A. Hepatitis A
- B. Hepatitis B
- C. Hepatitis C
- D. Hepatitis D

Hepatitis B is a DNA virus.

686 Which of the following about Hepatitis A virus is false ?

Harrison's 18th Ed. 2537

- A. Enveloped
- B. Heat resistant
- C. Acid resistant
- D. Ether resistant

Hepatitis A virus is a nonenveloped 27-nm, heat, acid, and ether-resistant RNA virus in the hepatovirus genus of the picornavirus family.

687 Four capsid polypeptides of Hepatitis A virion are designated as ?

Harrison's 18th Ed. 2537

- A. SP1 to SP4
- B. HP1 to HP4
- C. VP1 to VP4
- D. WP1 to WP4

Hepatitis A virion contains four capsid polypeptides, designated VP1 to VP4. These are cleaved posttranslationally from the polyprotein product of a 7500-nucleotide genome.

688 Inactivation of Hepatitis A virus can be achieved by ?

Harrison's 18th Ed. 2537

- A. Formaldehyde
- B. Chlorine
- C. Ultraviolet irradiation
- D. All of the above

Inactivation of viral activity can be achieved by boiling for 1 minute, by formaldehyde and chlorine, or by ultraviolet irradiation.

689 Hepatitis A has an incubation period of ?

Harrison's 18th Ed. 2538

- A. ~ 2 weeks
- B. ~ 4 weeks
- C. ~ 6 weeks
- D. ~ 8 weeks

Hepatitis A has an incubation period of ~4 weeks.

690 Replication of Hepatitis A virus occurs in ?

Harrison's 18th Ed. 2538

- A. Liver
- B. Bile
- C. Blood
- D. All of the above

Hepatitis A virus replication is limited to liver. But, the virus is present in liver, bile, stools, and blood during the late incubation period and acute preicteric phase of illness.

691 Which of the following statements about Hepatitis A virus is false ?

Harrison's 18th Ed. 2538

- A. HAV can be cultivated reproducibly in vitro
- B. Virus is present in liver, bile, stools and blood during late incubation period & acute preicteric phase of illness
- C. Viral shedding in feces, viremia and infectivity diminish rapidly once jaundice becomes apparent
- D. None of the above

Despite persistence of virus in liver, viral shedding in feces, viremia, and infectivity diminish rapidly once jaundice becomes apparent.

692 After acute illness, anti-HAV of IgG class remains detectable for ?

Harrison's 18th Ed. 2538

- A. 3 months
- B. 6 months
- C. 12 months
- D. Indefinitely

After acute illness, anti-HAV of the IgG class remains detectable indefinitely.

693 Which of the following has the largest virus particle size ?

Harrison's 18th Ed. 2537, Figure 304-1

- A. Hepatitis A
- B. Hepatitis D
- C. Hepatitis C
- D. Hepatitis E

694 Which of the following has the smallest virus particle size ?

Harrison's 18th Ed. 2537, Figure 304-1

- A. Hepatitis A
- B. Hepatitis D
- C. Hepatitis C
- D. Hepatitis E

Hepatitis A virus (27-nm), Hepatitis B virus (42-nm), Hepatitis C virus (55-nm), Hepatitis D virus (35–37 nm) and Hepatitis E virus (32–34 nm)

695 Which of the following has the largest viral genome size ?

Harrison's 17th Ed. 1937

- A. Hepatitis A
- B. Hepatitis B
- C. Hepatitis C
- D. Hepatitis E

696 Which of the following has the smallest viral genome size ?

Harrison's 17th Ed. 1937

- A. Hepatitis A
- B. Hepatitis B
- C. Hepatitis C
- D. Hepatitis E

HAV - 7.5 kb, HBV 3.2 kb, HCV - 9.4 kb, HDV - 1.7 kb, HEV - 7.6 kb.

697 HBV belongs to which family of viruses ?

Harrison's 18th Ed. 2539, Table 304-1

- A. Hepadnaviruses
- B. Hepatovirus
- C. Hepacivirus
- D. Hepevirus

HBV belongs to hepadnaviruses family of viruses, type 1 ("hepa" from hepatotrophic and "dna" because it is a DNA virus), HAV is a Hepatovirus, HCV is Hepacivirus and HEV is a Hepevirus. HDV resembles viroids and plant satellite viruses.

698 The four overlapping genes of encoding proteins in Hepatitis B virus are ?

Harrison's 18th Ed. 2538

- A. S, C, P and X
- B. S, T, U and V

- C. S, O, M and Z
- D. S, Q, C, and Y

In Hepatitis B virus, the four overlapping genes encoded by the genome are S, C, P and X.

699 Hepadnaviruses also infect which of the following ?

Harrison's 18th Ed. 2538

- A. Woodchucks
- B. Ground and tree squirrels
- C. Pekin ducks
- D. All of the above

700 Out of the following, who is related to the discovery of Australia antigen ?

- A. Alter MJ
- B. Baruch Blumberg
- C. Bouchard MJ
- D. Zuckerman AJ

In 1965, Baruch Blumberg, working at National Institutes of Health (NIH), discovered the Australia antigen (later known to be Hepatitis B surface antigen, or HBsAg) in the blood of Australian aboriginal people.

701 Which of the following is false about HBV genome ?

Harrison's 18th Ed. 2538

- A. Circular genome
- B. Partially double-strand and partially single-strand
- C. Replicates through an RNA intermediate form by reverse transcription
- D. None of the above

Hepatitis B is a non-retroviral virus which uses reverse transcription for its replication.

702 Which of the following about Hepatitis B virus is false ?

N Engl J Med 2004;351:2832-8

- A. Enveloped, double-stranded DNA virus
- B. Smallest dsDNA virus known to infect humans
- C. Primary reservoir is chronically infected people
- D. Insects can transmit HBV

703 Which of the following about Hepatitis B virus is false ?

N Engl J Med 2004;351:2832-8

- A. Blood contains highest concentrations of virus
- B. Not transmitted by fecal-oral route
- C. Vertical transmission from mother to child possible
- D. Breast milk can cause viral transmission

704 Which of the following about Hepatitis B virus is false ?

N Engl J Med 2004;350:1118-29

- A. Replication of DNA genome by reverse transcription of RNA intermediate
- B. Covalently closed circular DNA (cccDNA) is formed in hepatocyte nucleus
- C. Most abundant protein in HBV genome is S protein
- D. Risk of development of chronicity is directly related to age at time of infection

705 Which is the largest overlapping gene in Hepatitis B virus ?

Harrison's 18th Ed. 2538, Figure 304-3

- A. S
- B. C
- C. P
- D. X

The P gene of HBV is the largest gene and codes for DNA polymerase.

706 Which of the following statements about overlapping genes in Hepatitis B virus is false ?

Harrison's 18th Ed. 2538, Figure 304-3

- A. S gene codes for HBsAg
- B. P gene codes for DNA polymerase
- C. C gene codes for HBeAg & HBcAg
- D. X gene codes for HBeAg

The S gene codes for the "major" envelope protein, HBsAg. The largest gene, P, codes for DNA polymerase. C gene codes for nucleocapsid proteins - HBeAg and HBcAg. X gene codes for HBxAg which can transactivate the transcription of cellular and viral genes

707 Which particulate form of HBV is most numerous in blood ?

Harrison's 18th Ed. 2538

- A. 22-nm
- B. 27-nm
- C. 42-nm
- D. All of the above

Of the three particulate forms of HBV, the most numerous are the 22-nm particles, which appear as spherical or long filamentous forms. These are antigenically indistinguishable from outer surface or envelope protein of HBV and are thought to represent excess viral envelope protein.

708 Which is the common group-reactive antigen in different HBsAg subdeterminants ?

Harrison's 18th Ed. 2538

- A. a
- B. b
- C. c
- D. d

In different HBsAg subdeterminants, common group-reactive antigen, "a" is shared by all HBsAg isolates.

709 Number of genotypes if Hepatitis B isolates is ?

Harrison's 18th Ed. 2538

- A. 4
- B. 8
- C. 12
- D. 16

In 1988, hepatitis B virus (HBV) was classified into four genotypes by a sequence divergence in the entire genome exceeding 8%, and designated by capital letters of the alphabet from A to D. Later four more were added from E to H. Genotype H is phylogenetically closely related to genotype F.

710 Genotypes of HBV were defined by a sequence divergence greater than what percentage in the entire genome ?

- A. 2
- B. 4
- C. 6
- D. 8

Genotypes of HBV were defined by a sequence divergence greater than 8% in the entire genome.

711 Which of the following is not a major serotype of HBV ?*Harrison's 18th Ed. 2538*

- A. add
- B. adw
- C. ayr
- D. ayw

HBV virus is divided into 4 major serotypes (adr, adw, ayr, ayw) based on antigenic epitopes present on its envelope proteins, and into eight genotypes (A-H) according to overall nucleotide sequence variation of the genome. Genotypes of HBV were defined by a sequence divergence > 8% in the entire genome. HBsAg serotypes adw, adr, ayw and ayr are readily determined by immunological methods, and they were regarded the phenotypic expression of HBV genotypes. All HBV isolates of genotype A or B isolates were adw and all genotype D isolates were ayw. Isolates of genotype C were heterogeneous and covered adw, adr and ayr.

712 The protein product of S region in Hepatitis B virus is ?*Harrison's 18th Ed. 2539*

- A. Major protein
- B. Middle protein
- C. Large protein
- D. All of the above

713 The protein product of S gene in Hepatitis B virus is ?*Harrison's 18th Ed. 2539*

- A. Major protein
- B. Middle protein
- C. Large protein
- D. All of the above

714 The protein product of S region plus pre-S2 region in Hepatitis B virus is ?*Harrison's 18th Ed. 2539*

- A. Major protein
- B. Middle protein
- C. Large protein
- D. All of the above

715 The protein product of pre-S1 plus pre-S2 plus S regions in Hepatitis B virus is ?*Harrison's 18th Ed. 2539*

- A. Major protein
- B. Middle protein
- C. Large protein
- D. All of the above

The envelope protein, HBsAg, is the product of the S gene of HBV. HBsAg gene is one long open reading frame but contains 3 in frame "start" (ATG) codons that divide the gene into 3 sections, pre-S1, pre-S2, and S. S gene codes for the "major" envelope protein - HBsAg. "Large" protein is the product of pre-S1 + pre-S2 + S. "Middle" protein is the product of pre-S2 + S.

716 HBsAg is also called ?*Harrison's 18th Ed. 2539*

- A. Major protein
- B. Middle protein
- C. Large protein
- D. All of the above

The S gene codes for the "major" envelope protein, HBsAg.

717 Which of the following is not a nucleocapsid protein ?*Harrison's 18th Ed. 2539*

- A. HBsAg
- B. HBeAg
- C. HBcAg
- D. All of the above

The C gene codes for two nucleocapsid proteins, HBeAg and HBcAg. If translation is initiated at the precore region of C gene, the protein product is HBeAg, while if translation begins with the core region of C gene, HBcAg is the protein product.

718 Which of the following represents excess virus coat material ?*Harrison's 18th Ed. 2539*

- A. HBsAg
- B. HBeAg
- C. HBcAg
- D. HBxAg

719 In Hepatitis B virus, which of the following is a 'secreted' nucleocapsid protein ?*Harrison's 18th Ed. 2539*

- A. HBsAg
- B. HBeAg
- C. HBcAg
- D. HBxAg

HBeAg is a soluble, secreted nucleocapsid protein. HBeAg provides a convenient, readily detectable, qualitative marker of HBV replication and relative infectivity. HBeAg has a signal peptide that binds it to the smooth endoplasmic reticulum and leads to its secretion into the circulation.

720 Which of the following is qualitative marker of HBV replication & relative infectivity ?*Harrison's 18th Ed. 2540*

- A. HBsAg
- B. HBeAg
- C. HBcAg
- D. HBxAg

HBsAg-positive serum containing HBeAg is highly infectious and associated with presence of hepatitis B virions than HBeAg-negative or anti-HBe-positive serum. Anti-HBeAg positivity usually indicates low infectivity and no replication, unless patient is precore mutant.

721 Persistence of HBeAg in serum beyond how many months of acute infection is predictive of chronic infection ?*Harrison's 18th Ed. 2540*

- A. 1 month
- B. 2 month
- C. 3 month
- D. Any of the above

HBeAg appears transiently and early during acute hepatitis B infection. Persistence of HBeAg in serum beyond the first three months of acute infection may be predictive of the development of chronic infection.

722 Which of the following particles of HBV do not circulate in the serum ?*Harrison's 18th Ed. 2540*

- A. HBsAg
- B. HBcAg
- C. HBeAg
- D. All of the above

HBeAg is intracellular. When in serum, it is within an HBsAg coat. Therefore, naked HBcAg particles do not circulate in serum and are not detectable routinely in serum of patients with HBV infection.

723 Hepatitis B patients contain which of the following circulating antibodies ?

Harrison's 18th Ed. 2540

- A. Anti-HBe Ag
- B. Anti-HBs Ag
- C. Anti HBcAg
- D. All of the above

Hepatitis B patients contain circulating antibodies against HBcAg (hepatitis B core antigen), & develop antibodies against HBeAg & HBsAg (anti-HBe & anti-HBs) at later stages.

724 Which of the following HBV genes codes for DNA polymerase ?

Harrison's 18th Ed. 2540

- A. S
- B. C
- C. P
- D. X

Gene P of the HBV genes is the largest and codes for DNA polymerase which has both DNA-dependent DNA polymerase and RNA-dependent reverse transcriptase activities.

725 Which of the following is a nonparticulate protein of HBV ?

Harrison's 18th Ed. 2540

- A. HBeAg
- B. HBcAg
- C. HBxAg
- D. All of the above

726 Which of the following HBV antigens stimulates HBV reverse transcription and HBV DNA replication ?

Harrison's 18th Ed. 2540

- A. HBsAg
- B. HBeAg
- C. HBcAg
- D. HBxAg

Hepatitis B x antigen (HBxAg) activates signal-transduction pathways that lead to stimulation of HBV reverse transcription and HBV DNA replication.

727 Expression of which of the following HBV antigens induces programmed cell death (apoptosis) ?

Harrison's 18th Ed. 2540

- A. HBsAg
- B. HBeAg
- C. HBcAg
- D. HBxAg

Expression of HBxAg induces programmed cell death (apoptosis).

728 Clinical association is observed between expression of which of the following & severe chronic hepatitis & hepatocellular carcinoma ?

Harrison's 18th Ed. 2540

- A. HBsAg
- B. HBeAg
- C. HBcAg
- D. HBxAg

Because HBxAg transactivation enhances replication of HBV, clinical association is observed between its expression with severe chronic hepatitis and hepatocellular carcinoma.

729 Which of the following is transactivated by expression of HBxAg ?

Harrison's 18th Ed. 2540

- A. Transcription & replication of HIV
- B. Transactivation of human interferon gene
- C. Transactivation of class I major histocompatibility genes
- D. All of the above

730 Which of the following statements is true ?

Harrison's 18th Ed. 2540

- A. Circulating HBsAg precedes elevations of SGOT/SGPT
- B. Circulating HBsAg follow elevations of SGOT/SGPT
- C. Circulating HBsAg coincide with elevations of SGOT/SGPT
- D. None of the above

Circulating HBsAg precedes elevations of serum aminotransferase activity and clinical symptoms by 2 - 6 weeks and remains detectable during the entire icteric or symptomatic phase of acute hepatitis B and beyond.

731 After the onset of jaundice, HBsAg rarely persists beyond how many months ?

Harrison's 18th Ed. 2540

- A. 1 months
- B. 3 months
- C. 6 months
- D. 9 months

In typical cases, HBsAg becomes undetectable 1 - 2 months after the onset of jaundice and rarely persists beyond 6 months.

732 After infection with HBV, the first virologic marker detectable in serum is ?

Harrison's 18th Ed. 2540

- A. HBsAg
- B. HBeAg
- C. HBcAg
- D. HBxAg

Upon HBV infection, the first virologic marker detectable in serum within 1-12 weeks, usually between 8-12 weeks is HBsAg.

733 Of the following antibodies against HBV, which one is first to appear ?

Harrison's 18th Ed. 2540

- A. Anti-HBc
- B. Anti-HBs
- C. Anti-HBe
- D. None of the above

734 Of the following antibodies against HBV, which one is detected last ?

Harrison's 18th Ed. 2540

- A. Anti-HBc
- B. Anti-HBs
- C. Anti-HBe
- D. None of the above

Of the 3 antibodies against HBV, anti-HBc develops first, whereas anti-HBs antibody is detected last. Anti-HBc appears in serum within the first 1 - 2 weeks after appearance of HBsAg & preceding anti-HBs by weeks to months. Anti-HBs becomes detectable after HBsAg disappears in serum and remains detectable indefinitely thereafter.

735 Which of the following about HBsAg in acute HBV infection is false ?

Harrison's 18th Ed. 2540

- A. Precedes rise in ALT
- B. Precedes clinical symptoms
- C. Detectable during entire icteric phase
- D. Rarely persists beyond 3 months

Circulating HBsAg precedes rise in serum aminotransferase levels & clinical symptoms by 2-6 weeks and remains detectable during the entire icteric phase of acute hepatitis B and beyond. HBsAg becomes undetectable 1-2 months after onset of jaundice & rarely persists beyond 6 months.

736 Which of the following about serology in acute HBV infection is false ?

Harrison's 18th Ed. 2540

- A. Anti-HBs appears after HBsAg disappears
- B. Anti-HBs remains detectable indefinitely
- C. Anti-HBs precedes appearance of anti-HBc
- D. HBeAg appears with HBsAg

After HBsAg disappears, antibody to HBsAg (anti-HBs) becomes detectable in serum & remains detectable indefinitely. HBcAg naked core particles do not circulate in serum & therefore, HBcAg is not detectable routinely in serum of patients with HBV infection. Anti-HBc is readily demonstrable in serum, beginning within first 1-2 weeks after appearance of HBsAg & preceding detectable levels of anti-HBs by weeks to months. HBeAg appears concurrently with or shortly after HBsAg.

737 Which of the following is true during "gap" or "window" period in acute HBV infection ?

Harrison's 18th Ed. 2540

- A. Absence of HBsAg
- B. Absence of anti-HBs
- C. Presence of IgM anti-HBc
- D. All of the above

At times a gap of several weeks or longer may separate disappearance of HBsAg & appearance of anti-HBs. During this "gap" or "window" period, anti-HBc may be the only serologic evidence of current or recent HBV infection & blood containing IgM anti-HBc in the absence of HBsAg & anti-HBs has been implicated in development of transfusion-associated hepatitis B. HBV DNA may be low or undetected.

738 Presence of which of the following represents hepatitis B infection in remote past ?

Harrison's 18th Ed. 2540

- A. Anti-HBc
- B. Anti-HBs
- C. Anti-HBe
- D. Any of the above

Isolated anti-HBc represent hepatitis B infection in the remote past. IgM anti-HBc predominates during the first six months after acute infection, whereas IgG anti-HBc persists beyond six months. Generally, in persons who have recovered from hepatitis B, anti-HBs and anti-HBc persist indefinitely.

739 Isolated presence of which of the following suggests hepatitis B infection in remote past ?

Harrison's 18th Ed. 2540

- A. HBsAg
- B. Anti-HBs
- C. IgM anti-HBc
- D. IgG anti-HBc

After HBV infection, anti-HBc may persist in circulation longer than anti-HBs. Isolated anti-HBc does not indicate active virus replication but indicates HBV infection in remote past.

740 Recent and remote HBV infections can be distinguished by determination of ?

Harrison's 18th Ed. 2540

- A. Anti-HBs
- B. IgM anti-HBc
- C. IgG anti-HBc
- D. All of the above

IgM anti-HBc predominates in first 6 months after acute infection, whereas IgG anti-HBc predominates beyond 6 months. In persons who have recovered from hepatitis B, anti-HBs & anti-HBc persist indefinitely.

741 Which of the following genotype of HBV is frequent in India ?

- A. A
- B. B
- C. C
- D. Any of the above

742 Which of the following is false about the serology in first stage of HBV patient ?

- A. Presence of HBsAg
- B. Presence of HBeAg
- C. Presence of anti-HBs antibody
- D. Presence of IgM anti-HBc antibody

First stage of HBV infection is characterized by presence of HBsAg, HBeAg, and IgM class of anti-HBc antibodies. In intermediate stage, patients lose HBeAg, develop anti-HBe antibodies & enter into clinical remission. Finally, loss of HBsAg & rise of the anti-HBs antibody indicate recovery from infection.

743 Which of the following is false about expression of core protein and HBeAg ?

- A. Core protein is translated from pregenomic mRNA, using the ATG codon at 1901 as initiation site
- B. HBeAg is translated from precore mRNA, using ATG at 1814
- C. G1896A nonsense mutation in precore region specifically prevents translation of HBeAg
- D. None of the above

Core protein is translated from pregenomic mRNA, using the ATG codon at 1901 as initiation site. HBeAg is translated from the precore mRNA, using ATG at 1814. G1896A nonsense mutation in the precore region specifically prevents translation of HBeAg.

744 HBeAg differs from HBcAg by a ?

- A. Longer N-terminus and longer C-terminal tail
- B. Shorter N-terminus and shorter C-terminal tail
- C. Shorter N-terminus and longer C-terminal tail
- D. Longer N-terminus and shorter C-terminal tail

HBeAg differs from core protein (HBcAg) by a longer N-terminus and shorter C-terminal tail.

745 Which of the following statements about HBV is false ?

- A. HBeAg is not part of the virus particle
- B. Anti-HBc antibody rises soon after infection
- C. HBeAg expression is not essential for virus replication
- D. None of the above

746 HBeAg-negative chronic hepatitis B or e-CHB is characterised by all except ?

- A. HBsAg-positive for at least 6 months
- B. HBeAg-positive

- C. Anti-HBe-positive
- D. HBV DNA detectable in serum unamplified assays

e-CHB or HBeAg-negative chronic hepatitis B patients are HBsAg-positive for at least 6 months, HBeAg-negative, anti-HBe-positive, with HBV DNA detectable in serum unamplified assays, and active liver disease (elevated AST or ALT, liver histology showing chronic hepatitis with or without cirrhosis).

747 Which of the following is expressed during periods of peak replication ?

Harrison's 18th Ed. 2541

- A. HBeAg
- B. Pre-S1 proteins
- C. Pre-S2 proteins
- D. All of the above

HBeAg, appears concurrently with or shortly after HBsAg and its appearance coincides expression of pre-S1 and pre-S2 proteins marking high levels of virus replication and presence of circulating intact virions and detectable HBV DNA.

748 Which of the following is the qualitative marker of the replicative stage of HBV infection ?

Harrison's 18th Ed. 2541

- A. HBsAg
- B. HBcAg
- C. HBeAg
- D. HBxAg

Replicative stage of HBV infection is the time of maximal infectivity & liver injury. HBeAg is a qualitative marker & HBV DNA a quantitative marker of replicative phase, during which all three forms of HBV circulate, including intact virions.

749 Replicative phase of chronic HBV infection converts to relatively nonreplicative phase at a rate of ?

Harrison's 18th Ed. 2541

- A. 10 % per year
- B. 20 % per year
- C. 30 % per year
- D. 40 % per year

Replicative phase of chronic HBV infection converts to a relatively nonreplicative phase at a rate of 10% per year accompanied by seroconversion from HBeAg-positive to anti-HBe-positive.

750 Seroconversion from HBeAg-positive to anti-HBe-positive is accompanied by which of the following ?

Harrison's 18th Ed. 2541

- A. Acute elevation in aminotransferase activity
- B. Hemoglobinuria
- C. Anemia
- D. All of the above

Seroconversion from HBeAg-positive to anti-HBe-positive is accompanied by a transient, acute hepatitis-like elevation in aminotransferase activity, believed to reflect cell-mediated immune clearance of virus-infected hepatocytes.

751 Spontaneous reactivation of replicative HBV infection from nonreplicative phase is marked by which of the following ?

Harrison's 18th Ed. 2541

- A. Re-expression of HBeAg
- B. Re-expression of HBV DNA
- C. Reappearance of IgM anti-HBc
- D. All of the above

Spontaneous reactivations i.e. nonreplicative HBV infection converting back to replicative infection is accompanied by re-expression of HBeAg and HBV DNA, IgM anti-HBc and exacerbations of liver injury.

752 HBV infections is self-limited if ?

Harrison's 18th Ed. 2541

- A. HBeAg becomes undetectable after peak rise in ALT
- B. HBeAg becomes undetectable before disappearance of HBsAg
- C. Anti-HBe becomes detectable before disappearance of HBsAg
- D. All of the above

753 Which of the following about HBeAg in acute HBV infection is false ?

Harrison's 18th Ed. 2541

- A. Appears with HBsAg
- B. Appearance coincides with high viral replication
- C. Undetectable after peak rise in ALT
- D. Undetectable after disappearance of HBsAg

HBeAg presence coincides with high levels of virus replication and reflects the presence of circulating intact virions and detectable HBV DNA. In self-limited HBV infections, HBeAg becomes undetectable shortly after peak elevations in aminotransferase activity, before the disappearance of HBsAg, and anti-HBe then becomes detectable, coinciding with a period of relatively lower infectivity.

754 Which of the following about chronic HBV infection is false ?

Harrison's 18th Ed. 2541

- A. HBsAg detectable > 6 months
- B. IgG anti-HBc present
- C. Anti-HBs low to absent
- D. None of the above

In chronic HBV infection, HBsAg remains detectable beyond 6 months, anti-HBc is primarily of the IgG class, and anti-HBs is either undetectable or detectable at low levels.

755 Replicative chronic hepatitis B in the absence of HBeAg occurs in which of the following situations ?

Harrison's 18th Ed. 2541

- A. Patients with core mutations
- B. Patients with precore mutations
- C. Patients with pre S1 mutations
- D. Patients with pre S2 mutations

Replicative chronic hepatitis B in the absence of HBeAg occurs in patients with precore mutations who cannot synthesize HBeAg.

756 HBeAg-negative chronic hepatitis with mutations in the precore region is now the most frequently encountered form of hepatitis B in which region of the world ?

Harrison's 18th Ed. 2541

- A. North America
- B. South America
- C. Mediterranean countries
- D. Southeast Asia

HBeAg-negative chronic hepatitis with mutations in the precore region is now the most frequently encountered form of hepatitis B in Mediterranean countries and in Europe.

757 Which of the following is false about severe chronic HBV infection due to precore region HBV mutant ?

Harrison's 18th Ed. 2541

- A. Detectable HBV DNA
- B. HBeAg negative
- C. Anti-HBe positive
- D. None of the above

Molecular variants of HBV may not express typical viral proteins i.e. nucleocapsid proteins, envelope proteins, or both. Severe chronic HBV infection due to precore region HBV mutation have detectable HBV DNA (> 105 copies/ml), and anti-HBe but no HBeAg as the mutant virus is incapable of encoding HBeAg. This is an example of single base substitution, from G to A, which occurs in the second to last codon of pre-C gene at nucleotide 1896 results in the replacement of the TGG tryptophan codon by a stop codon (TAG), which prevents the translation of HBeAg.

758 HBV escape mutants best relate to which of the following ?

Harrison's 18th Ed. 2541

- A. Single base substitution
- B. Single base addition
- C. Single amino acid substitution
- D. Single amino acid addition

In escape mutants of HBV there occurs a single amino acid substitution, from glycine to arginine at position 145 of the immunodominant "a" determinant common to all subtypes of HBsAg. This change in HBsAg leads to a loss of neutralizing activity by anti-HBs. This HBV/a mutant is seen in active and passive immunization, and in liver transplant recipients who underwent the procedure for hepatitis B and who were treated with a high-potency human monoclonal anti-HBs preparation.

759 Extrahepatic site where Hepatitis B antigen and HBV DNA has been identified is ?

Harrison's 18th Ed. 2541

- A. Bone marrow
- B. Spleen
- C. Pancreas
- D. All of the above

Although not associated with tissue injury, extrahepatic site where Hepatitis B antigens and HBV DNA have been identified include lymph nodes, bone marrow, circulating lymphocytes, spleen, and pancreas.

760 Which of the following is a member of the genus Deltavirus ?

Harrison's 18th Ed. 2542

- A. Hepatitis D virus
- B. Marburg virus
- C. California encephalitis virus
- D. All of the above

Delta hepatitis agent (HDV) is the only member of the genus Deltavirus.

761 Which of the following is false about delta hepatitis virus ?

Harrison's 18th Ed. 2542

- A. Defective RNA virus
- B. 35- to 37-nm in size
- C. 1700-nucleotide genome
- D. Has antigenic homology with HBV antigens

HDV is a defective RNA virus that coinfects with and requires the helper function of HBV for its replication & expression. It is formalin-sensitive, 35- to 37-nm virus with a hybrid structure. Its genome is a 1700-nucleotide, circular, single-strand RNA. Delta antigen bears no antigenic homology with any of the HBV antigens.

762 The delta core of HDV is "encapsidated" by an outer envelope of ?

Harrison's 18th Ed. 2542

- A. HBcAg
- B. HBsAg
- C. HBeAg
- D. Any of the above

The delta core of HDV is "encapsidated" by an outer envelope of HBsAg quite like that of HBV.

763 The single-stranded RNA genome of HDV is homologous to an extent with which gene of HBV ?

Harrison's 18th Ed. 2542

- A. S
- B. C
- C. P
- D. X

HDV genome is a small, 1700-nucleotide, circular, single-strand RNA of negative polarity that is nonhomologous with HBV DNA, except for a small area of the polymerase gene.

764 HDV RNA requires which of the following for its replication ?

Harrison's 18th Ed. 2542

- A. Host RNA polymerase I
- B. Viral RNA polymerase I
- C. Host RNA polymerase II
- D. Viral RNA polymerase II

HDV RNA requires host RNA polymerase II for its replication via RNA-directed RNA synthesis by transcription of genomic RNA to a complementary antigenomic (plus strand) RNA. The antigenomic RNA, in turn, serves as a template for subsequent genomic RNA synthesis.

765 Which of the following is false about delta hepatitis virus ?

Harrison's 18th Ed. 2542

- A. HDV antigen is expressed in hepatocyte nuclei
- B. Intracellular replication of HDV RNA can occur without HBV
- C. Duration of HDV infection determined by duration of HBV infection
- D. In acute HDV infection, anti-HDV detected before symptoms appear

In acute HDV infection, anti-HDV is detected 30-40 days after symptoms appear.

766 Which of the following is an HDV protein ?

Harrison's 18th Ed. 2542

- A. HDAg
- B. HDsAg
- C. HDeAg
- D. All of the above

HDV RNA has only one open reading frame, and delta antigen (HDAg), a product of the antigenomic strand is the only known HDV protein.

767 Which of the following hepatitis was earlier called "non-A, non-B hepatitis" ?

Harrison's 18th Ed. 2542

- A. Hepatitis A
- B. Hepatitis B
- C. Hepatitis C
- D. Hepatitis E

Before its identification, Hepatitis C virus was labeled as "non-A, non-B hepatitis".

768 Hepatitis C virus was first identified in which year ?

- A. 1986
- B. 1989
- C. 1992
- D. 1995

Hepatitis C virus was first identified in 1989.

769 Which of the following is a member of family Flaviviridae ?

Harrison's 18th Ed. 2542

- A. Yellow fever virus
- B. Dengue virus
- C. Hepatitis C virus
- D. All of the above

Members of family Flaviviridae are Yellow fever virus, Dengue virus, St. Louis encephalitis virus, West Nile virus, Hepatitis C virus (HCV) and Hepatitis G virus. HCV however is the only member of the genus Hepacivirus in the family Flaviviridae.

770 Which of the following is the structural gene in hepatitis C virus genome ?

Harrison's 18th Ed. 2543, Figure 304-6

- A. C
- B. E1
- C. E2
- D. All of the above

The three structural genes at the 5' end of hepatitis C virus genome are C - which codes for nucleocapsid, and E1 and E2 - which code for envelope glycoproteins.

771 In hepatitis C virus genome, which of the following functions as an ion channel ?

Harrison's 18th Ed. 2543, Figure 304-6

- A. C
- B. E1
- C. E2
- D. p7

Placed adjacent to the structural proteins, p7 is a membrane protein that appears to function as an ion channel.

772 Which of the following nonstructural regions of hepatitis C virus genome codes for RNA-dependent RNA polymerase ?

Harrison's 18th Ed. 2543, Figure 304-6

- A. NS3
- B. NS4
- C. NS5A
- D. NS5B

At 3' end are six nonstructural (NS) regions, NS2, which codes for a cysteine protease; NS3, which codes for a serine protease and an RNA helicase; NS4 and NS4B; NS5A; and NS5B, which codes for an RNA-dependent RNA polymerase.

773 Which of the following is false about HCV ?

Harrison's 18th Ed. 2542

- A. 40 - 60 nm in diameter
- B. 9600-nucleotide RNA virus
- C. Its half-life is 2.7 hours
- D. None of the above

774 Which of the following is false about HCV ?

Harrison's 18th Ed. 2543

- A. HCV enters hepatocyte via CD81 receptor
- B. HCV infection does not induce lasting immunity against reinfection
- C. Most sensitive indicator of HCV infection is the presence of HCV RNA
- D. None of the above

HCV gains entry into the hepatocyte via the nonliver-specific CD81 receptor and the liver-specific tight junction protein claudin-1. Most sensitive indicator of HCV infection is presence of HCV RNA, that requires molecular amplification by PCR or transcription-mediated amplification (TMA).

775 HCV masquerades as which of the following ?

Harrison's 18th Ed. 2543

- A. Viroid
- B. Nucleocapsid protein
- C. Lipoprotein
- D. CD81 receptor

HCV masquerades as a lipoprotein.

776 Number of HCV genotypes identified is ?

Harrison's 18th Ed. 2543

- A. 2
- B. 3
- C. 4
- D. 6

Till date HCV genotypes identified are 6 as well as >50 subtypes within genotypes.

777 HCV genotypes differ one from another in sequence homology by ?

Harrison's 18th Ed. 2543

- A. 10 %
- B. 20 %
- C. 30 %
- D. 40 %

Genotypes differ one from another in sequence homology by 30%. Those with less differences in sequence homology are referred to as quasispecies.

778 HCV RNA is reported as ?

Harrison's 18th Ed. 2543

- A. International units (IUs) per milliliter
- B. Microgram per milliliter
- C. Copies per milliliter
- D. Virions per milliliter

HCV RNA is reported as international units (IUs) per milliliter.

779 Which of the following is the first detectable event during acute hepatitis C progressing to chronicity ?

Harrison's 18th Ed. 2543, Figure 304-7

- A. HCV RNA
- B. HCV DNA
- C. Elevated alanine aminotransferase (ALT)
- D. Elevation and appearance of anti-HCV

During acute hepatitis C progressing to chronicity, HCV RNA is the first detectable event, preceding alanine aminotransferase (ALT) elevation and the appearance of anti-HCV.

780 "Epidemic, non-A, non-B hepatitis" relates to which of the following ?

N Engl J Med 2012;367:1237-44, Harrison's 18th Ed. 2543

- A. Hepatitis A
- B. Hepatitis B
- C. Hepatitis C
- D. Hepatitis E

Hepatitis E was initially identified in 1980 as “epidemic or enterically transmitted, non-A, non-B hepatitis”, an infectious, waterborne illness similar to hepatitis A.

781 In India, most common cause of acute hepatitis is ?

Harrison's 18th Ed. 2543

- A. Hepatitis A
- B. Hepatitis B
- C. Hepatitis C
- D. Hepatitis E

In India, enterically transmitted HEV is the most common cause of acute hepatitis.

782 Which of the following about HEV is false ?

N Engl J Med 2012;367:1237-44, Harrison's 18th Ed. 2543

- A. Enveloped virus
- B. Single-stranded, positive-sense RNA genome
- C. Genome is 7.6 kb in length
- D. Genome contains three open reading frames (ORFs)

HEV is a small (32- to 34-nm), nonenveloped virus with a single-strand, positive-sense RNA genome (7.6 kb in length) which contains three partially overlapping open reading frames (ORFs) bracketed by short 5' and 3' nontranslated regions.

783 ORF1 encodes which of the following nonstructural proteins ?

N Engl J Med 2012;367:1237-44

- A. Methyl transferase (MT)
- B. Cysteine protease (Pro)
- C. Helicase (Hel)
- D. All of the above

ORF1 encodes nonstructural proteins namely methyl transferase (MT), cysteine protease (Pro), helicase (Hel), and RNA polymerase (Pol). ORF1 also encodes three regions of unknown function (Y, H, and X).

784 Which of the following ORF in Hepatitis E virus genome encodes the nonstructural, enzymatic activities required for viral replication ?

N Engl J Med 2012;367:1237-44, Harrison's 18th Ed. 2543

- A. ORF1
- B. ORF2
- C. ORF3
- D. All of the above

Largest of three ORFs, ORF1 encodes the nonstructural, enzymatic activities required for viral replication.

785 In HEV, which of the following genes encode the nucleocapsid protein ?

Harrison's 18th Ed. 2543

- A. ORF1
- B. ORF2
- C. ORF3
- D. All of the above

The middle-sized open reading frame 2 (ORF2) gene in HEV encodes the nucleocapsid protein. ORF1 encodes nonstructural proteins involved in virus replication. The smallest ORF3, encodes a structural protein whose function remains undetermined.

786 ORF gene relates to ?

Harrison's 18th Ed. 2543

- A. Hepatitis A
- B. Hepatitis B

- C. Hepatitis C
- D. Hepatitis E

HEV has three open reading frames (ORF) genes.

787 Which of the following acts as an animal reservoir contributing to the perpetuation of HEV ?

Harrison's 18th Ed. 2543

- A. Swine
- B. Bird
- C. Fish
- D. Dog

Contributing to the perpetuation of HEV are animal reservoirs, most notably in swine.

788 Which of the following best relates to HEV ?

N Engl J Med 2012;367:1237-44, Harrison's 18th Ed. 2543

- A. Flaviviridae
- B. Hepeviridae
- C. Rhabdoviridae
- D. Arenaviridae

HEV was the first member to be identified in the Hepeviridae family.

789 Which of the following about HEV is false ?

N Engl J Med 2012;367:1237-44

- A. HEV replicates in cytoplasm
- B. Genotypes 1 and 2 are human viruses
- C. Genotypes 3 and 4 are swine viruses
- D. None of the above

HEV replicates in cytoplasm. Four genotypes of HEV have been categorized into two major groups. Genotypes 1 and 2 are human viruses that cause epidemic hepatitis with waterborne and fecal-oral transmission. Genotypes 3 and 4 are swine viruses.

790 Which of the following about HEV infection is false ?

N Engl J Med 2012;367:1237-44

- A. HEV RNA is detectable in stool during incubation period
- B. HEV RNA is detectable in serum during incubation period
- C. IgM antibody is undetectable during recovery
- D. None of the above

Both IgM anti-HEV and IgG anti-HEV appear early during acute infection, but both fall rapidly after acute infection, reaching low levels within 9 - 12 months.

791 Incubation period of acute hepatitis E infection is ?

N Engl J Med 2012;367:1237-44

- A. 1 to 2 weeks
- B. 2 to 4 weeks
- C. 3 to 8 weeks
- D. 6 to 12 weeks

Acute hepatitis E has an incubation period of 3 to 8 weeks.

792 Average case fatality rate in acute HEV infections is ?

N Engl J Med 2012;367:1237-44

- A. 0 %
- B. 2 %
- C. 3 %
- D. 5 %

Acute hepatitis E is mostly self-limited without progression to chronic hepatitis. Average case fatality rate is ~ 5 %.

793 Clinical features of autochthonous hepatitis E include all except ?

N Engl J Med 2012;367:1237-44

- A. Disease rates highest among older adults
- B. Hepatitis E is preventable by vaccination
- C. No neurologic complications
- D. Ribavirin, peginterferon indicated

In endemic, or autochthonous hepatitis E, the average age was more than 60 years, and men outnumbered women by at least 3 to 1. Hepatitis E is preventable by vaccination. Autochthonous HEV infection is usually subclinical and mild. Autochthonous hepatitis E has frequent serious complications, including "acute-on-chronic" liver failure, neurologic disorders (polyradiculopathy, the GBS, Bell's palsy, peripheral neuropathy, ataxia, and mental confusion), and chronic hepatitis. Chronic hepatitis E is also susceptible to antiviral therapy (peginterferon, ribavirin, or a combination of two).

794 Chronic infection in Hepatitis E has been identified almost exclusively among ?

N Engl J Med 2012;367:1237-44

- A. Pre-existing liver disease
- B. Blood transfusion recipients
- C. Pork eaters
- D. Immunocompromised persons

Chronic HEV infection has been identified almost exclusively among immunocompromised persons (organ transplant recipients, patients receiving cancer chemotherapy, and HIV-infected persons). Blood transfusion is a potential but rare route of HEV transmission. Chronic hepatitis E is characterized by the persistence of HEV RNA in serum & stool, accompanied by fluctuating, mild-to-moderate elevations in serum ALT levels and low or moderate titers of IgG and IgM anti-HEV antibodies.

795 Which of the following statements is false ?

Harrison's 18th Ed. 2544

- A. Hepatitis B virus is not directly cytopathic
- B. HBcAg invites cytolytic T cells to destroy HBV-infected hepatocytes
- C. Inactive hepatitis B carriers can have normal liver histology
- D. None of the above

796 Which of the following statements is false ?

Harrison's 18th Ed. 2544

- A. Patients with defects in cellular immune competence are more likely to remain chronically infected with HBV
- B. Chronic HBV infection can occur in the absence of serum hepatitis B e antigen (HBeAg)
- C. Most characteristic histologic feature of chronic HBV infection is "ground-glass hepatocyte" due to intracellular accumulation of HBsAg
- D. None of the above

797 Which of the following is associated with a more severe outcome of HBV infection ?

Harrison's 18th Ed. 2544

- A. Infection with precore genetic mutants of HBV
- B. Concomitant HDV and HBV infections
- C. In liver transplantation for end-stage chronic hepatitis B
- D. All of the above

798 HBV infection in neonatal period is associated with all except ?

Harrison's 18th Ed. 2544

- A. Acquisition of immunologic tolerance to HBV

- B. Absence of acute-hepatitis illness
- C. Almost invariable establishment of chronic infection
- D. Never go into cirrhosis & hepatocellular carcinoma

Neonataly acquired HBV infection can may culminate into cirrhosis & hepatocellular carcinoma.

799 HBV infection acquired during adolescence or early adulthood is associated with all except ?

Harrison's 18th Ed. 2544

- A. Robust host-immune response
- B. Acute hepatitis-like illness
- C. Failure to recover is the exception
- D. Chronicity is common

Chronicity is uncommon and risk of hepatocellular carcinoma is very low.

800 Which of the following HLA allele has been linked with self-limited hepatitis C ?

Harrison's 18th Ed. 2544

- A. HLA-B*1501
- B. HLA-B*5701
- C. Single nucleotide polymorphism T allele at IL28B locus
- D. C/C haplotype of the IL28B gene

C/C haplotype of the IL28B gene has been linked with self-limited hepatitis C.

801 Which of the following plays a pathogenetic role in the extrahepatic manifestations of acute hepatitis B ?

Harrison's 18th Ed. 2545

- A. Cytopathic role of virus
- B. Immune complex - mediated tissue damage
- C. Cryoprecipitable immune complexes
- D. All of the above

Immune complex - mediated tissue damage plays a pathogenetic role in the extrahepatic manifestations of acute hepatitis B.

802 Which of the following is an extrahepatic manifestation of hepatitis B ?

Harrison's 18th Ed. 2545

- A. Glomerulonephritis with nephrotic syndrome
- B. Polyarteritis nodosa
- C. Essential mixed cryoglobulinemia (EMC)
- D. All of the above

803 Which of the following is the pathognomonic manifestation of HCV infection ?

- A. Necrolytic acral erythema
- B. Porphyria cutanea tarda
- C. Leucocytoclastic vasculitis
- D. Lichen planus (LP)

Necrolytic acral erythema is a rare, but pathognomonic manifestation of HCV.

804 Mixed cryoglobulinemia (MC) is associated with which of the following ?

Harrison's 18th Ed. 2545

- A. HAV
- B. HCV
- C. HDV

D. HEV

Mixed cryoglobulinemia (MC) is unequivocally associated with HCV.

805 Which type of cryoglobulinemia is associated with lymphoproliferative diseases ?

- A. Types I
- B. Types II
- C. Types III
- D. Any of the above

Type I cryoglobulinemia is monoclonal & associated with lymphoproliferative diseases (multiple myeloma, Waldenström macroglobulinemia). Types II & III are mixed & polyclonal cryoglobulinemias and are associated with autoimmune disorders, viral infections, & chronic liver disease (Brouet classification).

806 Classic triad of cryoglobulinemic syndrome includes all except ?

- A. Purpura
- B. Arthralgias
- C. Weakness
- D. Acrocyanosis

Classic triad of cryoglobulinemic syndrome consists of purpura, arthralgias & weakness. Others are glomerulonephritis, peripheral neuropathy, generalized vasculitis, livedo reticularis, ischemic ulcers, acrocyanosis and hemorrhagic bullae.

807 Cryoglobulins are immunoglobulins that precipitate at temperatures below ?

- A. 37°C
- B. 36°C
- C. 35°C
- D. 34°C

Cryoglobulins are immunoglobulins that precipitate at temperatures below 37°C and re-dissolve with warming.

808 Morphologic lesions of viral hepatitis are all except ?

Harrison's 18th Ed. 2545

- A. Panlobular mononuclear cells infiltration
- B. Hepatic cell necrosis
- C. Cholestasis
- D. Atrophy of Kupffer cells

Typical morphologic lesions of all types of viral hepatitis are panlobular infiltration with mononuclear cells, hepatic cell necrosis, Kupffer cells hyperplasia & variable cholestasis. Hepatic cell regeneration is present.

809 Panlobular mononuclear infiltration in viral hepatitis consists "primarily" of ?

Harrison's 18th Ed. 2545

- A. Plasma cells
- B. Small lymphocytes
- C. Large lymphocytes
- D. Eosinophils

Panlobular mononuclear infiltration in viral hepatitis consists "primarily" of small lymphocytes. Plasma cells & eosinophils are present occasionally.

810 William Thomas Councilman (1854-1933) was of which nationality ?

- A. British
- B. American

C. Ireland

D. Canadian

Councilman bodies are named after American pathologist William Thomas Councilman (1854-1933) who discovered them.

811 Councilman bodies are best related to ?

Harrison's 18th Ed. 2545

- A. Fibrosis
- B. Liver cell regeneration
- C. Apoptosis
- D. Growth arrest

Liver cell damage leads to acidophilic degeneration of hepatocytes called Councilman or apoptotic bodies.

812 Which of the following is seen in chronic but not in acute HBV infection ?

Harrison's 18th Ed. 2545

- A. Acidophilic degeneration of hepatocytes
- B. Ballooning of hepatocytes
- C. Hepatocyte dropout
- D. Ground-glass appearance of cytoplasm

Large hepatocytes with a ground-glass appearance of the cytoplasm may be seen in chronic but not in acute HBV infection.

813 Ground-glass appearance of the cytoplasm in chronic HBV infection is due to ?

Harrison's 18th Ed. 2545

- A. HBsAg
- B. HBeAg
- C. HBcAg
- D. HBxAg

Ground-glass appearance of the cytoplasm in chronic HBV infection is due to HBsAg and can be identified histochemically with orcein or aldehyde fuchsin.

814 In hepatitis C, the most remarkable histologic feature is ?

Harrison's 18th Ed. 2545

- A. Marked increase in activation of sinusoidal lining cells
- B. Relative paucity of inflammation
- C. Lymphoid aggregates
- D. Bile duct lesions

In hepatitis C, the histologic lesion is remarkable for a relative paucity of inflammation.

815 Marked cholestasis is a feature of ?

Harrison's 18th Ed. 2545

- A. HAV
- B. HCV
- C. HDV
- D. HEV

Marked cholestasis is a common histologic feature of hepatitis E.

816 What was earlier called bridging hepatic necrosis is also called ?

Harrison's 18th Ed. 2545

- A. Gradual hepatitis
- B. Interface hepatitis

- C. Coupled hepatitis
- D. Destruction hepatitis

In acute hepatitis, bridging hepatic necrosis, also termed subacute or confluent necrosis or interface hepatitis is observed occasionally.

817 What was earlier called piecemeal necrosis is now called ?

Harrison's 17th Ed. 1938

- A. Gradual hepatitis
- B. Interface hepatitis
- C. Coupled hepatitis
- D. Destruction hepatitis

Piecemeal necrosis or limiting plate necrosis is now called "interface hepatitis".

818 In bridging hepatic necrosis, the bridge consists of ?

Harrison's 18th Ed. 2545

- A. Condensed reticulum
- B. Inflammatory debris
- C. Degenerating liver cells
- D. All of the above

In bridging hepatic necrosis, the bridge consists of condensed reticulum, inflammatory debris, and degenerating liver cells that span adjacent portal areas, portal to central veins, or central vein to central vein. There is collapse of the reticulin framework.

819 Which of the following is localized to hepatocyte nucleus ?

Harrison's 18th Ed. 2545

- A. HAV antigen
- B. HCV antigen
- C. HDV antigen
- D. HEV antigen

HDV antigen is localized to hepatocyte nucleus, while HAV, HCV & HEV antigens are localized to the cytoplasm.

820 Which of the following hepatitis can be transmitted by fecal-oral route ?

Harrison's 18th Ed. 2546, Table 304-2

- A. Hepatitis B
- B. Hepatitis C
- C. Hepatitis D
- D. None of the above

Hepatitis A is transmitted almost exclusively by the fecal-oral route.

821 Which of the following body fluid from infected persons is most infectious ?

Harrison's 18th Ed. 2546

- A. Semen
- B. Saliva
- C. Serum
- D. All are equally infectious

HBsAg is identified in almost every body fluid from infected persons. Semen & saliva are infectious though less than serum.

822 Which of the following is the mode of HBV transmission ?

Harrison's 18th Ed. 2547

- A. Percutaneous inoculation
- B. Sexual contact

- C. Perinatal transmission
- D. All of the above

823 What is not true for Hepatitis B virus infections ?

N Engl J Med 2004;351:2832-8

- A. Can be transmitted through breast milk
- B. Incubation period for acute infection is 45 to 160 days
- C. Risk of chronicity in infected neonates is 90 %
- D. No known animal reservoirs

~10% of HBV infections are acquired in utero. Most infections occur at the time of delivery and early postpartum period & are not related to breast feeding.

824 Perinatal transmission occurs in infants born to HBsAg carrier mothers during ?

Harrison's 18th Ed. 2547

- A. First trimester of pregnancy
- B. Second trimester of pregnancy
- C. Third trimester of pregnancy
- D. Any of the above

Perinatal transmission occurs primarily in infants born to HBsAg carrier mothers or mothers with acute hepatitis B during third trimester of pregnancy or during the early postpartum period.

825 Which of the following mothers almost invariably transmit hepatitis B infection to their offspring ?

Harrison's 18th Ed. 2547

- A. HBsAg-positive + HBeAg-positive
- B. HBsAg-negative + HBeAg-negative
- C. HBsAg-positive + HBeAg-negative
- D. HBsAg-negative + HBeAg-positive

HBsAg positive mothers who are HBeAg-positive almost invariably (>90%) transmit hepatitis B infection to their offspring, whereas HBsAg carrier mothers with anti-HBe rarely (10 - 15%) infect their offspring.

826 Likelihood of perinatal transmission of HBV correlates with the presence of ?

Harrison's 18th Ed. 2547

- A. HBsAg
- B. HBcAg
- C. HBeAg
- D. HBxAg

Likelihood of perinatal transmission of HBV correlates with presence of HBeAg. 90% of HBeAg-positive mothers but only 10–15% of anti-HBe-positive mothers transmit HBV infection to their offspring.

827 Hepatitis B virus (HBV) chronically infects how many people worldwide ?

Harrison's 18th Ed. 2547

- A. 50 million
- B. 100 million
- C. 250 million
- D. 350 million

Hepatitis B virus (HBV) chronically infects over 350 million people worldwide.

828 Prevalence of HBV sero-positivity is more in ?

Harrison's 18th Ed. 2547

- A. Down's syndrome
- B. Lepromatous leprosy

- C. Hodgkin's disease
- D. All of the above

Prevalence of 5-20% is found in Down's syndrome, lepromatous leprosy, leukemia, Hodgkin's disease, polyarteritis nodosa, CKD patients on dialysis and IDUs.

829 Risk of acquiring HBV infection from a blood transfusion is ?

Harrison's 18th Ed. 2547

- A. 1 in 50,000
- B. 1 in 140,000
- C. 1 in 230,000
- D. 1 in 320,000

Because of highly sensitive virologic screening of donor blood, risk of acquiring HBV infection from a blood transfusion is 1 in 230,000 while it is 1 in 2.3 million for transfusion-associated HCV infection.

830 Which of the following about HCV infection is false ?

Harrison's 18th Ed. 2547

- A. Accounts for 40% of chronic liver disease
- B. Most frequent indication for liver transplantation
- C. Worldwide, genotype 1 is the most common
- D. Breast-feeding increases risk of HCV vertical infection

Worldwide, genotype 1 is the most common. Genotype 4 predominates in Egypt; genotype 5 is localized to South Africa, and genotype 6 to Hong Kong. Breast-feeding does not increase the risk of HCV infection between an infected mother and her infant.

831 Hepatitis virus with longest incubation period is ?

Harrison's 18th Ed. 2546, Table 304-2

- A. Hepatitis A
- B. Hepatitis B
- C. Hepatitis C
- D. Hepatitis E

832 Hepatitis virus with an incubation period of ~2 weeks is ?

Harrison's 18th Ed. 2546, Table 304-2

- A. Hepatitis A
- B. Hepatitis C
- C. Hepatitis E
- D. All of the above

Incubation period in days : HAV - 15-45, mean 30, HBV - 30-180, mean 60-90, HCV - 15-160, mean 50, HDV - 30-180, mean 60-90, HEV - 14-60, mean 40.

833 Viral hepatitis with an insidious onset only is ?

Harrison's 18th Ed. 2546, Table 304-2

- A. Hepatitis A
- B. Hepatitis B
- C. Hepatitis C
- D. Hepatitis E

Onset : HAV - acute, HBV - insidious or acute, HCV - insidious, HDV - insidious or acute, HEV - acute

834 Which of the following about presentation of acute viral hepatitis is false ?

Harrison's 18th Ed. 2549

- A. Constitutional symptoms may precede onset of jaundice by 1 - 2 weeks
- B. Dark urine & clay-colored stools occur 1 - 5 days before onset of clinical jaundice

- C. Alterations in olfaction and taste
- D. None of the above

835 Which of the following is a presentation of acute viral hepatitis ?

Harrison's 18th Ed. 2549

- A. Splenomegaly
- B. Cervical adenopathy
- C. Spider angiomas
- D. All of the above

836 Acute hepatitis B is self-limited in what proportion of cases ?

Harrison's 18th Ed. 2549

- A. 50 - 69 %
- B. 69 - 79 %
- C. 79 - 89 %
- D. 95 - 99 %

Acute hepatitis B is self-limited in 95 - 99% of infections, while hepatitis C is self-limited in only 15%.

837 Acute hepatitis-like clinical events in chronic hepatitis B may be due to ?

Harrison's 18th Ed. 2549

- A. HDV superinfection
- B. Spontaneous HBeAg to anti-HBe seroconversion
- C. Spontaneous reactivation
- D. All of the above

Apart from the above conditions, acute clinical exacerbations of chronic hepatitis B may be due to emergence of a precore mutant.

838 The diagnosis of anicteric hepatitis is based on ?

Harrison's 18th Ed. 2549

- A. S. Aminotransferase levels
- B. S. Bilirubin levels
- C. S. Alkaline phosphatase levels
- D. S. GGT levels

The diagnosis of anicteric hepatitis is based on clinical features & on aminotransferase elevations.

839 In acute hepatitis, very high serum bilirubin level (20 - 30 mg/dL) occur in ?

Harrison's 18th Ed. 2549

- A. Severe disease
- B. Glucose-6-phosphate dehydrogenase deficiency
- C. Sickle cell anemia
- D. All of the above

Bilirubin levels >20 mg/dL persisting late into the course of viral hepatitis is associated with severe disease. Patients with underlying hemolytic anemia, like glucose-6-phosphate dehydrogenase deficiency and sickle cell anemia, also have high serum bilirubin levels (>30 mg/dL) due to superimposed hemolysis.

840 Which of the following occur transiently in acute viral hepatitis ?

Harrison's 18th Ed. 2549

- A. Neutropenia
- B. Lymphopenia
- C. Steatorrhea
- D. All of the above

Neutropenia and lymphopenia are transient and are followed by a relative lymphocytosis. Also, mild and transient steatorrhea, microscopic hematuria and minimal proteinuria have been noted.

841 Which of the following is characteristically elevated during acute hepatitis A ?

Harrison's 18th Ed. 2550

- A. Serum IgG
- B. Serum IgM
- C. Serum IgA
- D. Serum IgE

A diffuse but mild elevation of the gamma globulin fraction is common during acute viral hepatitis. Serum IgM level is elevated more characteristically during acute hepatitis A.

842 Which of the following antibodies may be present during the acute phase of viral hepatitis ?

Harrison's 18th Ed. 2550

- A. Rheumatoid factor
- B. Nuclear antibody
- C. Heterophil antibody
- D. All of the above

During the acute phase of viral hepatitis, antibodies to smooth muscle and other cell constituents may be present, and low titers of rheumatoid factor, nuclear antibody, and heterophil antibody can also be found. In hepatitis C and D, antibodies to LKM may be found.

843 If levels of HBsAg are too low to be detected during acute HBV infection, which of the following establishes its diagnosis ?

Harrison's 18th Ed. 2550

- A. IgM anti-HBc
- B. IgG anti-HBc
- C. IgM & IgG anti-HBc
- D. HBeAg

If levels of HBsAg are too low to be detected during acute HBV infection, presence of IgM anti-HBc establishes its diagnosis. HBeAg is invariably present during early acute hepatitis B, HBeAg testing is indicated primarily during follow-up of chronic infection.

844 Which of the following is true in chronic HBV infection ?

Harrison's 18th Ed. 2550

- A. IgM anti-HBc-positive, IgG anti-HBc-positive
- B. IgM anti-HBc-negative, IgG anti-HBc-negative
- C. IgM anti-HBc-negative, IgG anti-HBc-positive
- D. IgM anti-HBc-positive, IgG anti-HBc-negative

IgM anti-HBc may be useful to distinguish between acute or recent infection (IgM anti-HBc-positive) and chronic HBV infection (IgM anti-HBc-negative, IgG anti-HBc-positive).

845 A false-positive test for IgM anti-HBc may be found in patients with ?

Harrison's 18th Ed. 2550

- A. Glucose-6-phosphate dehydrogenase deficiency
- B. High-titer rheumatoid factor
- C. Sickle cell anemia
- D. All of the above

A false-positive test for IgM anti-HBc may be encountered in patients with high-titer rheumatoid factor.

846 Presence of anti-HBs in the presence of HBsAg in patients with acute hepatitis B indicates which of the following ?

Harrison's 18th Ed. 2550

- A. Fulminant hepatitis

- B. Chronicity
- C. Imminent HBsAg clearance
- D. None of the above

Anti-HBs is rarely detectable in the presence of HBsAg in patients with acute hepatitis B. When this happens, its of no recognized clinical significance.

847 After hepatitis B vaccination, which is the only serologic marker to appear ?

Harrison's 18th Ed. 2550

- A. Anti-HBs
- B. Anti-HBe
- C. Anti-HBc
- D. All of the above

After immunization with hepatitis B vaccine, which consists of HBsAg alone, anti-HBs is the only serologic marker to appear.

848 In chronic hepatitis B, high levels of HBV DNA increase the risk of ?

Harrison's 18th Ed. 2551

- A. Cirrhosis
- B. Hepatic decompensation
- C. Hepatocellular carcinoma
- D. All of the above

In chronic hepatitis B, high levels of HBV DNA increase the risk of cirrhosis, hepatic decompensation, and hepatocellular carcinoma.

849 Relapsing hepatitis is a feature of ?

Harrison's 18th Ed. 2552

- A. Acute hepatitis A
- B. Acute hepatitis B
- C. Acute hepatitis C
- D. Hepatitis D superinfection

Complications of hepatitis A include relapsing hepatitis appearing weeks to months after apparent recovery from acute hepatitis, cholestatic hepatitis and rarely fulminant hepatitis.

850 Extrahepatic manifestations of HCV include ?

Harrison's 18th Ed. 2552

- A. Mixed cryoglobulinemia
- B. Porphyria cutanea tarda
- C. Lichen planus (LP)
- D. All of the above

Well-accepted extrahepatic manifestations of HCV include pruritus, mixed cryoglobulinemia & necrolytic acral erythema. Frequently associated conditions include porphyria cutanea tarda, leucocytoclastic vasculitis, lichen planus, sicca syndrome & polyarteritis nodosa.

851 Fulminant hepatitis is rare in ?

Harrison's 18th Ed. 2552

- A. Hepatitis A
- B. Hepatitis B & D
- C. Hepatitis E
- D. All of the above

Fulminant hepatitis is primarily seen in hepatitis B and D, and hepatitis E. It is rare in hepatitis A.

852 Out of the following, fulminant hepatitis is most common in ?

Harrison's 18th Ed. 2552

- A. Hepatitis A

- B. Hepatitis B
- C. Hepatitis C
- D. Hepatitis E

Hepatitis B accounts for >50% of fulminant cases of viral hepatitis.

853 Fulminant hepatitis is hardly ever seen in ?

Harrison's 18th Ed. 2552

- A. Hepatitis A
- B. Hepatitis B
- C. Hepatitis C
- D. Hepatitis E

Fulminant hepatitis is hardly ever seen in hepatitis C.

854 Likelihood of remaining chronically infected after acute HBV infection is high in all except ?

Harrison's 18th Ed. 2552

- A. Old
- B. Down's syndrome
- C. Chronically hemodialyzed patients
- D. HIV infection

Likelihood of remaining chronically infected after acute HBV infection is high among neonates, Down's syndrome, chronically hemodialyzed patients & immunosuppressed patients, including those with HIV infection.

855 Progression of acute to chronic hepatitis is likely if ?

Harrison's 18th Ed. 2552

- A. HBeAg persists for >3 months
- B. HBsAg persists for >6 months
- C. AST/ALT do not normalise within 6-12 months
- D. All of the above

Progression of acute hepatitis to chronic hepatitis is likely if clinical symptoms do not resolve, AST/ALT, bilirubin and globulin levels fail to normalise within 6-12 months, HBeAg persists for >3 months and HBsAg persists for >6 months.

856 Likelihood of remaining chronically infected after acute HCV infection is ?

Harrison's 18th Ed. 2553

- A. 25 - 40 %
- B. 40 - 60 %
- C. 65 - 75 %
- D. 85 - 90 %

After acute HCV infection, the likelihood of remaining chronically infected approaches 85-90%.

857 Gianotti-Crosti syndrome is best related to ?

Harrison's 18th Ed. 2553

- A. Hepatitis A
- B. Hepatitis B
- C. Hepatitis C
- D. Hepatitis E

Gianotti-Crosti syndrome or papular acrodermatitis of childhood refers to hepatitis B that presents with anicteric hepatitis, nonpruritic papular rash of face, buttocks & limbs & lymphadenopathy.

858 Hepatitis A vaccines provide adequate protection how many weeks after a primary inoculation ?

Harrison's 18th Ed. 2555

- A. 1 week

- B. 2 weeks
- C. 3 weeks
- D. 4 weeks

Formalin-inactivated vaccines made from strains of HAV attenuated in tissue culture are safe, immunogenic, and effectively prevent hepatitis A. Hepatitis A vaccines provide adequate protection beginning 4 weeks after a primary inoculation.

859 Hepatitis A vaccine is administered by which route ?

Harrison's 18th Ed. 2555

- A. Intradermal
- B. Subcutaneous
- C. Intramuscular
- D. Intravenous

Hepatitis A vaccine is administered intramuscularly.

860 The first vaccine for hepatitis B active immunization was prepared from ?

Harrison's 18th Ed. 2555

- A. 22-nm spherical forms of HBsAg
- B. 27-nm spherical forms of HBsAg
- C. 42-nm spherical forms of HBsAg
- D. All of the above

First vaccine for active immunization (1982) was prepared from purified, noninfectious 22-nm spherical forms of HBsAg derived from plasma of healthy HBsAg carriers.

861 Which of the following is the difference between plasma-derived vaccine and genetically engineered Hepatitis B vaccine ?

Harrison's 18th Ed. 2555

- A. Nonglycosylated
- B. Hydrolyzed
- C. Oxidized
- D. Heat attenuated

Plasma-derived Hepatitis B vaccine is prepared from purified, noninfectious 22-nm spherical forms of HBsAg derived from plasma of healthy HBsAg carriers, while genetically engineered Hepatitis B vaccine is derived from recombinant yeast and consists of HBsAg particles that are nonglycosylated but are otherwise indistinguishable from natural HBsAg;

862 Hepatitis B vaccine is administered ?

Harrison's 18th Ed. 2555

- A. Intradermally
- B. Subcutaneously
- C. Intramuscularly
- D. Intravenously

863 In adults, recommended site of Hepatitis B vaccine is ?

Harrison's 18th Ed. 2555

- A. Thigh muscle
- B. Triceps muscle
- C. Deltoid muscle
- D. Gluteal muscle

864 After the first dose of Hepatitis B vaccine, the third dose is given after ?

Harrison's 18th Ed. 2555

- A. One month
- B. Three months

- C. Six months
- D. Twelve months

For preexposure prophylaxis against hepatitis B, three IM injections of hepatitis B vaccine in deltoid, not gluteal muscle are recommended at 0, 1, and 6 months.

865 Engerix-B for adults contains what amount of HBsAg in 1 ml. ?

Harrison's 18th Ed. 2556

- A. 5 µg
- B. 10 µg
- C. 15 µg
- D. 20 µg

866 For postexposure HBV prophylaxis, dose of HBIG is ?

Harrison's 18th Ed. 2556

- A. 0.02 mL / kg
- B. 0.04 mL / kg
- C. 0.06 mL / kg
- D. 0.08 mL / kg

For postexposure HBV prophylaxis, dose of HBIG is a single intramuscular dose of HBIG, 0.06 mL/kg, administered as soon after exposure as possible and followed by a complete course of hepatitis B vaccine to begin within the first week.

867 Which of the following statements about Hepatitis B vaccination is false ?

Harrison's 18th Ed. 2556

- A. Pregnancy is not a contraindication to vaccination
- B. Booster immunizations are not recommended routinely
- C. Booster recommended if anti-HBs levels are <10 mIU/mL
- D. None of the above

868 True nonresponse after proper HBV vaccination means antibody level of less than ?

Harrison's 18th Ed. 2556, N Engl J Med 2004;351:2832-8

- A. 10 mIU/mL
- B. 15 mIU/mL
- C. 20 mIU/mL
- D. 50 mIU/mL

Booster immunizations are not recommended routinely in immunocompetent persons. Booster doses are recommended when anti-HBs levels fall to <10 mIU/mL.

869 HBV inactive carriers have serum HBV DNA level below ?

N Engl J Med 2008;359:1486-500

- A. 1000 IU per milliliter
- B. 10000 IU per milliliter
- C. 100000 IU per milliliter
- D. 1000000 IU per milliliter

Persons with a serum HBV DNA level below 1000 IU per milliliter and a normal ALT level consistently are considered to be inactive carriers.

870 Hepatitis B immune globulin (HBIG) is used in ?

N Engl J Med 2004;351:2832-8

- A. Infants born to HBsAg + mothers
- B. Contact with HBsAg + blood / bodily fluid
- C. Sexual contact with person who is HBsAg +
- D. All of the above

871 Groups for whom Hepatitis B vaccine is recommended include all except ?

N Engl J Med 2004;351:2832-8

- A. All infants
- B. Patients on peritoneal dialysis
- C. Persons at occupational risk
- D. Clients & staff of institutions for developmentally disabled

872 Groups for whom Hepatitis B vaccine is recommended include all except ?

N Engl J Med 2004;351:2832-8

- A. Recipients of clotting-factor concentrates
- B. Household members & sexual partners of HBV carriers
- C. Adoptees from countries where HBV infection is endemic
- D. Travelers spending > 6 weeks in HBV endemic areas

873 Leser-Trelat sign mostly points towards which pathology ?

Harrison's 17th Ed. 325

- A. Infection
- B. Neoplasm
- C. Nutritional deficiency
- D. Environmental toxin

Leser-Trélat sign refers to multiple pruritic seborrheic keratoses of sudden onset. Mostly associated with gastrointestinal adenocarcinomas, breast, lung, urinary tract cancers & lymphoid malignancies.

874 Which drug should be included in HAART regimen when Hepatitis B and HIV occur together ?

Harrison's 16th Ed. 1111

- A. Interferon alpha
- B. Entecavir
- C. Tenofovir
- D. None of the above

875 Wickman's striae are best related to ?

- A. Necrolytic acral erythema
- B. Porphyria cutanea tarda
- C. Leucocytoclastic vasculitis
- D. Lichen planus (LP)

LP is an inflammatory disease of skin & mucous membranes, characterized by pruritic, purple, polygonal, papules with an overlying reticulate pattern of white lines called Wickman's striae.

305 - Toxic and drug-induced hepatitis

876 Name of the prognostic law stating that a pure drug-induced liver injury (DILI) leading to jaundice, without a hepatic transplant, has a case fatality rate of 10% to 50% is ?

- A. Zy's law
- B. Ky's law
- C. Hy's law
- D. Wy's law

Hy's Law criteria: >3x ULN AST or ALT + >2x ULN TBL, no initial cholestasis (normal AP), no other prior or concomitant reason for liver function abnormality. Rezulin Rule is also a prognostic rule of DILI. Rezulin is the trade name of banned drug troglitazone.

877 Phase I reaction in drug metabolism include which of the following chemical process ?

N Engl J Med 2005;352:2211-21, Harrison's 18th Ed. 2558

- A. Oxidation
- B. Reduction
- C. Hydrolysis
- D. All of the above

878 Phase II reaction in drug metabolism include which of the following chemical process ?

N Engl J Med 2005;352:2211-21, Harrison's 18th Ed. 2558

- A. Glucuronidation
- B. Sulfation
- C. Acetylation
- D. All of the above

879 Phase II reactions in drug metabolism include all except ?

N Engl J Med 2005;352:2211-21, Harrison's 18th Ed. 2558

- A. Sulfation
- B. Glucuronidation
- C. Acetylation
- D. Hydrolysis

Drugs may be metabolized by sequential or competitive chemical processes involving oxidation, reduction & hydrolysis (phase I reactions) or glucuronidation, sulfation, acetylation & methylation (phase II reactions). CYP is important for phase I metabolism and are located primarily in endoplasmic reticulum, while phase 2 conjugation enzymes are cytosolic.

880 Which of the following is not a feature of direct toxic hepatitis ?

Harrison's 18th Ed. 2558

- A. Predictable regularity
- B. Dose-dependent
- C. Latent period usually long
- D. Morphologic abnormalities reproducible for each toxin

In direct toxic hepatitis, latent period between exposure and liver injury is usually short (often several hours), although clinical manifestations may be delayed for 24 - 48 hours.

881 Which of the following is not a feature of idiosyncratic drug hepatotoxicity ?

Harrison's 18th Ed. 2558

- A. Unpredictability
- B. Not dose-dependent
- C. Extrahepatic manifestations of hypersensitivity
- D. None of the above

882 Cytochrome P450 (CYP) was first discovered in 1954 by ?

- A. Wilhelm Kuhnz & Hille Gieschen
- B. Bernhardt
- C. Martin Klingenberg & David Garfinkel
- D. Akio Suzuki

883 Cytochrome P-450 enzymes (CYPs) are important in the biosynthesis and degradation of ?

N Engl J Med 2005;352:2211-21

- A. Steroids
- B. Lipids
- C. Vitamins

D. All of the above

Cytochrome P-450 enzymes (CYPs) are important in biosynthesis & degradation of endogenous compounds like steroids, lipids, and vitamins.

884 Antibody to liver-kidney microsomes associated with drug induced hepatitis is ?

Harrison's 18th Ed. 2558

- A. Anti LKM 1
- B. Anti LKM 2
- C. Anti LKM 3
- D. All of the above

Drug hepatotoxicity may be associated with the appearance of autoantibodies, including a class of antibodies to liver-kidney microsomes, anti-LKM2, directed against a cytochrome P450 enzyme.

885 Cytochrome P-450 enzymes (CYPs) are important in the biosynthesis & degradation of endogenous compounds like ?

N Engl J Med 2005;352:2211-21

- A. Steroids
- B. Lipids
- C. Vitamins
- D. All of the above

886 The P in P450 stands for ?

Am Fam Phys 1998;57:107-16

- A. Particle
- B. Pigment
- C. Pattern
- D. Protein

The P in P450 stands for "pigment".

887 "450" in Cytochrome P450 isoenzymes is related to ?

- A. Number of isoenzymes in liver
- B. Number of chemical reactions
- C. Number of electron needed for its activity
- D. Spectrophotometric absorption peak

Name cytochrome P450 is derived from the fact that these are colored ('chrome') cellular ('cyto') proteins, with a "pigment at 450 nm", so named for the characteristic spectrophotometric absorption peak formed by absorbance of light at wavelengths near 450 nm when the heme iron is reduced and complexed to carbon monoxide.

888 In CYP2E1, letter '2' indicates ?

- A. Gene family
- B. Gene subfamily
- C. Individual gene
- D. None of the above

"CYP" stands for cytochrome P450, followed by a numeral indicating gene family, a capital letter indicating subfamily and another numeral for the individual gene.

889 Which of the following about cytochrome P450 is false ?

- A. Hemoprotein
- B. Monooxygenase reaction
- C. Pigment at 450 nm
- D. None of the above

Cytochrome P450 belongs to a superfamily of hemoproteins. Most common reaction catalysed by cytochrome P450 is a monooxygenase reaction, i.e. insertion of one atom of oxygen into an organic substrate (RH) while the other oxygen atom is reduced to water: $RH + O_2 + 2H^+ + 2e^- = ROH + H_2O$

890 Which of the following enzyme is responsible for metabolism of most of the drugs used ?

Harrison's 18th Ed. 41

- A. CYP3A4
- B. CYP3A5
- C. CYP2D6
- D. CYP2C19

CYP3A4 is the most abundant hepatic and intestinal CYP and is also the enzyme responsible for metabolism of the greatest number of drugs in therapeutic use.

891 In liver, the family of cytochrome P450 (CYP) isoforms is present in ?

Harrison's 15th Ed. Chapter 70

- A. Endoplasmic reticulum
- B. Cell membrane
- C. Golgi bodies
- D. Nucleus

892 The catalytic activity of CYP2D6 in humans is best assessed by using which of the following drug ?

Harrison's 15th Ed. Chapter 70

- A. Debrisoquin
- B. Fluoxetine
- C. Perphenazine
- D. Dextromethorphan

CYP2D6 is second to CYP3A4 in the number of commonly used drugs that it metabolizes.

893 Which of the following cytochrome P-450 is present in enterocytes ?

N Engl J Med 2005;352:2211-21

- A. CYP1A2
- B. CYP2D6
- C. CYP2C9
- D. CYP3A

CYP3A is present in the enterocytes.

894 Which of the following CYP is found mainly in the glomerulosa zone of adrenal gland ?

- A. CYP11B2
- B. CYP3A5
- C. CYP2D6
- D. CYP2C19

CYP11B2 is found mainly if not exclusively in the glomerulosa zone of the adrenal gland.

895 Which of the following CYP is not expressed in neonates ?

- A. CYP1A2
- B. CYP3A5
- C. CYP2D6
- D. CYP2C19

CYP1A2 is not expressed in neonates, making them particularly susceptible to toxicity from drugs such as caffeine.

896 Drugs having a narrow range between the plasma levels yielding therapeutic and adverse effects include all except ?

Harrison's 15th Ed. Chapter 70

- A. Digoxin
- B. Theophylline
- C. Lidocaine
- D. Amiodarone

897 Which of the following anti-HIV agent is not a CYP3A inhibitor ?

N Engl J Med 2005;352:2211-21

- A. Indinavir
- B. Ritonavir
- C. Saquinavir
- D. Nevirapine

898 Which of the following macrolide antibiotics is not a CYP3A Inhibitor ?

N Engl J Med 2005;352:2211-21

- A. Clarithromycin
- B. Erythromycin
- C. Troleandomycin
- D. Azithromycin

899 Which of the following anticonvulsant agent is not a CYP3A Inducer ?

N Engl J Med 2005;352:2211-21

- A. Carbamazepine
- B. Phenobarbital
- C. Phenytoin
- D. Lamotrigine

900 Major hepatic isoenzyme involved in warfarin metabolism is ?

Harrison's 18th Ed. 36 Table 5-1

- A. CYP 2C9
- B. CYP 2C19
- C. CYP 2D6
- D. CYP 3A

901 Major hepatic isoenzyme involved in phenytoin metabolism is ?

Harrison's 18th Ed. 36 Table 5-1

- A. CYP 2C9
- B. CYP 2C19
- C. CYP 2D6
- D. CYP 3A

902 Major hepatic isoenzyme in omeprazole metabolism is ?

Harrison's 18th Ed. 36 Table 5-1

- A. CYP 2C9
- B. CYP 2C19
- C. CYP 2D6
- D. CYP 3A

903 Major hepatic isoenzyme in metoprolol metabolism is ?

Harrison's 18th Ed. 36 Table 5-1

- A. CYP 2C9
- B. CYP 2C19
- C. CYP 2D6
- D. CYP 3A

- 904 Major hepatic isoenzyme in tricyclic antidepressants metabolism is ?**
Harrison's 17th Ed. 29 Table 5-1
- CYP 2C9
 - CYP 2C19
 - CYP 2D6
 - CYP 3A
- 905 Major hepatic isoenzyme involved in selective serotonin reuptake inhibitors metabolism is ?**
Harrison's 18th Ed. 36 Table 5-1
- CYP 2C9
 - CYP 2C19
 - CYP 2D6
 - CYP 3A
- 906 Major hepatic isoenzyme involved in codeine metabolism is ?**
Harrison's 18th Ed. 36 Table 5-1
- CYP 2C9
 - CYP 2C19
 - CYP 2D6
 - CYP 3A
- 907 Major hepatic isoenzyme in cyclosporine metabolism is ?**
Harrison's 18th Ed. 36 Table 5-1
- CYP 2C9
 - CYP 2C19
 - CYP 2D6
 - CYP 3A
- 908 Major hepatic isoenzyme in statin metabolism is ?**
Harrison's 18th Ed. 36 Table 5-1
- CYP 2C9
 - CYP 2C19
 - CYP 2D6
 - CYP 3A
- 909 Major hepatic isoenzyme in phenytoin metabolism is ?**
Harrison's 18th Ed. 36 Table 5-1
- CYP 2C9
 - CYP 2C19
 - CYP 2D6
 - CYP 3A
- 910 Major hepatic isoenzyme in lidocaine metabolism is ?**
Harrison's 18th Ed. 36 Table 5-1
- CYP 2C9
 - CYP 2C19
 - CYP 2D6
 - CYP 3A
- 911 Major hepatic isoenzyme in quinidine metabolism is ?**
Harrison's 18th Ed. 36 Table 5-1
- CYP 2C9
 - CYP 2C19
 - CYP 2D6
 - CYP 3A
- 912 CYP enzyme activity inducers include ?**
Harrison's 18th Ed. 45
- Phenobarbital
 - Rifampin
 - Carbamazepine
 - All of the above
- 913 CYP enzyme activity inducers include ?**
Harrison's 18th Ed. 45
- Phenytoin
 - Smoking
 - Chronic alcohol ingestion
 - All of the above
- 914 CYP enzyme activity inducers lower plasma levels of which of the following drugs ?**
Harrison's 18th Ed. 45
- Warfarin
 - Quinidine
 - Mexiletine
 - All of the above
- 915 CYP enzyme activity inducers lower plasma levels of which of the following drugs ?**
Harrison's 18th Ed. 45
- Verapamil
 - Ketoconazole
 - Itraconazole
 - All of the above
- 916 CYP enzyme activity inducers lower plasma levels of which of the following drugs ?**
Harrison's 18th Ed. 45
- Cyclosporine
 - Dexamethasone
 - Methylprednisolone
 - All of the above
- 917 CYP enzyme activity inducers lower plasma levels of which of the following drugs ?**
Harrison's 18th Ed. 45
- Oral contraceptive steroids
 - Methadone
 - Metronidazole
 - All of the above
- 918 Which of the following drugs is associated with moderate to severe chronic hepatitis ?**
Harrison's 18th Ed. 2561
- Oxyphenisatin
 - Methyldopa
 - Isoniazid
 - All of the above

919 Which of the following drugs is implicated in the development of cirrhosis ?

Harrison's 18th Ed. 2561

- A. Oxyphenisatin
- B. Methyl dopa
- C. Isoniazid
- D. Halothane

Halothane and methotrexate have been implicated in the development of cirrhosis.

920 Syndrome resembling primary biliary cirrhosis can occur following treatment with ?

Harrison's 18th Ed. 2561

- A. Chlorpromazine
- B. Methyl testosterone
- C. Tolbutamide
- D. All of the above

921 Portal hypertension in the absence of cirrhosis may result from the use of ?

Harrison's 18th Ed. 2561

- A. Vitamin A
- B. Arsenic intoxication
- C. Exposure to vinyl chloride
- D. All of the above

922 Which of the following are associated with angiosarcoma of the liver ?

Harrison's 18th Ed. 2561

- A. Arsenic intoxication
- B. Vinyl chloride
- C. Thorium dioxide
- D. All of the above

Arsenic intoxication, industrial exposure to vinyl chloride, or administration of thorium dioxide have been associated with angiosarcoma of the liver.

923 Peliosis hepatis refers to ?

Harrison's 18th Ed. 2561

- A. Trauma of liver
- B. Blood cysts of liver
- C. Ectopic liver
- D. Unilobular liver

Peliosis hepatis refers to blood cysts of the liver.

924 Peliosis hepatis is seen in patients treated with ?

Harrison's 18th Ed. 2561

- A. Halothane
- B. Anabolic steroids
- C. Chlorpromazine
- D. Methotrexate

Peliosis hepatis has been observed in some patients treated with anabolic steroids.

925 Fatal fulminant liver disease is usually associated with ingestion of what amount of acetaminophen ?

Harrison's 18th Ed. 2561

- A. 5 grams

- B. 10 grams
- C. 20 grams
- D. 25 grams

Fatal fulminant liver disease is usually associated with ingestion of 25 grams of acetaminophen.

926 What level of acetaminophen in blood is predictive of severe liver damage ?

Harrison's 18th Ed. 2561

- A. >100 µg/mL
- B. >150 µg/mL
- C. >200 µg/mL
- D. >300 µg/mL

Blood levels of acetaminophen of >300 µg/mL, 4 hours after ingestion are predictive severe liver damage.

927 Maximal hepatic injury and hepatic failure occurs after how many days of acetaminophen ingestion ?

Harrison's 18th Ed. 2561

- A. 1 - 2 days
- B. 2 - 4 days
- C. 4 - 6 days
- D. 7 - 9 days

Maximal hepatic injury & hepatic failure appear 4 - 6 days after acetaminophen ingestion.

928 Which of the following is "hepatoprotective" ?

Harrison's 18th Ed. 2561

- A. Activated charcoal
- B. Cholestyramine
- C. Glutathione
- D. All of the above

Alcohol suppresses hepatic glutathione production.

929 N-acetyl-benzoquinone-imine (NAPQI) is best related to which of the following ?

Harrison's 18th Ed. 2561

- A. Acetaminophen
- B. Quinidine
- C. Azathioprine
- D. Carbamazepine

Most of acetaminophen is metabolized by phase II reaction to sulfate & glucuronide metabolites. Phase I reaction by CYP2E1 metabolizes a small amount of acetaminophen to N-acetyl-benzoquinone-imine (NAPQI) which is hepatotoxic. However, "hepatoprotective" glutathione binds NAPQI to form harmless mercapturic acid. Alcohol induces cytochrome P450 CYP2E1.

930 Oral activated charcoal or cholestyramine is useless how much time after ingestion ?

Harrison's 18th Ed. 2563

- A. > 30 minutes
- B. > 60 minutes
- C. > 90 minutes
- D. > 120 minutes

Oral activated charcoal or cholestyramine to prevent absorption of residual drug is useless if given >30 minutes after acetaminophen ingestion.

931 Which of the following have a role in the management of acetaminophen hepatotoxicity ?

Harrison's 18th Ed. 2563

- A. Cysteamine
- B. Cysteine
- C. N-acetylcysteine
- D. All of the above

If given within 8 hours of ingestion of acetaminophen, administration of sulphydryl compounds (cysteamine, cysteine, or N-acetylcysteine) reduces the severity of hepatic necrosis. These agents act by providing a reservoir of sulphydryl groups to bind toxic metabolites or by stimulating synthesis and repletion of hepatic glutathione. If these fail, liver transplantation may be the only option.

932 Which of the following about halothane hepatotoxicity is false ?

Harrison's 18th Ed. 2563

- A. Idiosyncratic reaction
- B. Halothane is not a direct hepatotoxin
- C. Cause severe centrilobular hepatic necrosis
- D. Cross-reactions between halothane & methoxyflurane

The pathologic changes produced by halothane hepatotoxicity are indistinguishable from massive hepatic necrosis resulting from viral hepatitis. Severe centrilobular hepatic necrosis is typical of acetaminophen toxicity.

933 Which of the following is false about methyldopa hepatotoxicity ?

Harrison's 18th Ed. 2563

- A. Toxic reaction
- B. Idiosyncratic reaction
- C. Resolves with discontinuation of drug
- D. None of the above

934 Isoniazid hepatotoxicity is enhanced by ?

Harrison's 18th Ed. 2564

- A. Alcohol
- B. Rifampin
- C. Pyrazinamide
- D. All of the above

Isoniazid hepatotoxicity is enhanced by alcohol, rifampin & pyrazinamide.

935 IV administration of carnitine may be ameliorate hepatotoxicity due to ?

Harrison's 18th Ed. 2564

- A. Valproate
- B. Isoniazid
- C. Halothane
- D. Acetaminophen

Valproate hepatotoxicity may be ameliorated by IV administration of carnitine.

936 Which metabolite of sodium valproate may be responsible for hepatic injury ?

Harrison's 18th Ed. 2564

- A. 1-pentenoic acid
- B. 2-pentenoic acid
- C. 3-pentenoic acid
- D. 4-pentenoic acid

Sodium valproate is not directly hepatotoxic, but its metabolite 4-pentenoic acid may be responsible for hepatic injury.

937 A defect in epoxide hydrolase activity could cause hepatotoxicity due to which drug ?

Harrison's 18th Ed. 2564

- A. Valproate
- B. Phenytoin
- C. Halothane
- D. Acetaminophen

A defect in epoxide hydrolase activity could cause hepatotoxicity due to Phenytoin.

938 Stevens-Johnson syndrome may be a presentation of toxicity due to ?

Harrison's 18th Ed. 2564

- A. Valproate
- B. Phenytoin
- C. Halothane
- D. Acetaminophen

Aparet from drug induced hepatitis, fever, lymphadenopathy, rash (Stevens-Johnson syndrome or exfoliative dermatitis), leukocytosis & eosinophilia may manifest in hepatotoxicity due to Phenytoin.

939 Which of the following is a major metabolite of Amiodarone ?

Harrison's 18th Ed. 2564

- A. Desmethyldiamiodarone
- B. Desethylamiodarone
- C. Levomethyldiamiodarone
- D. Levoethylamiodarone

940 Amiodarone metabolite desethylamiodarone accumulate in which of the following ?

Harrison's 18th Ed. 2564

- A. Hepatocyte lysosomes
- B. Hepatocyte mitochondria
- C. Bile duct epithelium
- D. All of the above

941 Toxicity with which of the following produces cholestatic idiosyncratic reaction ?

Harrison's 18th Ed. 2565

- A. Acetaminophen
- B. Erythromycin
- C. Azathioprine
- D. Carbamazepine

942 Drugs producing cholestatic reaction and portal inflammation is ?

Harrison's 18th Ed. 2565

- A. Erythromycin
- B. Oral contraceptive
- C. Chlorpromazine
- D. 17, α -Alkyl-Substituted Anabolic Steroids

943 In Trimethoprim-Sulfamethoxazole toxicity, hepatotoxicity is attributable to which component of the drug ?

Harrison's 18th Ed. 2565

- A. Sulfamethoxazole
- B. Trimethoprim
- C. Sulfamethoxazole + Trimethoprim
- D. None of the above

The hepatotoxicity with the use of Trimethoprim-Sulfamethoxazole is attributable to the sulfamethoxazole component of the drug.

944 The risk of trimethoprim-sulfamethoxazole hepatotoxicity is increased in persons with ?

Harrison's 18th Ed. 2565

- A. HIV infection
- B. Severe anemia
- C. Chronic renal failure
- D. Congestive heart failure

Risk of trimethoprim-sulfamethoxazole hepatotoxicity is increased in persons with HIV infection.

945 Statin hepatotoxicity is increased in which of the following patients ?

Harrison's 18th Ed. 2565

- A. Chronic hepatitis C
- B. Hepatic steatosis
- C. Other underlying liver diseases
- D. None of the above

Statin hepatotoxicity is "not" increased in patients with chronic hepatitis C, hepatic steatosis, or other underlying liver diseases, and statins can be used safely in these patients.

946 In Total Parenteral Nutrition (TPN), steatosis or steatohepatitis may result due to an excess of ?

Harrison's 18th Ed. 2565

- A. Carbohydrate calories
- B. Protein calories
- C. Fat calories
- D. Deficiency of minerals

In Total Parenteral Nutrition (TPN), steatosis or steatohepatitis may result due to an excess of carbohydrate calories.

306 - Chronic hepatitis

947 In chronic hepatitis, hepatic inflammation and necrosis continue for at least ?

Harrison's 18th Ed. 2567

- A. 3 months
- B. 6 months
- C. 9 months
- D. 12 months

In chronic hepatitis, hepatic inflammation & necrosis continue for at least 6 months.

948 Chronic hepatitis is due to ?

Harrison's 18th Ed. 2567

- A. Virus
- B. Drug-induced
- C. Autoimmune
- D. All of the above

Chronic viral hepatitis, drug-induced chronic hepatitis & autoimmune chronic hepatitis can cause chronicity.

949 Classification of chronic hepatitis is based on ?

Harrison's 18th Ed. 2567

- A. Cause
- B. Histologic activity, or grade
- C. Degree of progression, or stage
- D. All of the above

Classification of chronic hepatitis is based on its cause, its histologic assessment of necroinflammatory activity, or grade and its degree of progression, or stage.

950 Histologic activity index (HAI) scoring for necroinflammatory activity (grade) is done out of ?

Harrison's 18th Ed. 2568, Table 306-2

- A. 10
- B. 14
- C. 18
- D. 20

Out of a maximum of 18, individual scoring is degree of periportal necrosis (max. 4), degree of intralobular confluent necrosis (max. 6), degree of intralobular focal necrosis (max. 4) & degree of portal inflammation (max. 4).

951 Histologic activity index (HAI) scoring for fibrosis (stage) is done out of ?

Harrison's 18th Ed. 2568, Table 306-2

- A. 3
- B. 4
- C. 6
- D. 8

Staging is based on the degree of fibrosis as categorized on a numerical scale from 0-6 (HAI) or 0-4 (METAVIR).

952 Histologic activity index (HAI) scoring for necroinflammatory activity (grade) includes all except ?

Harrison's 18th Ed. 2568, Table 306-2

- A. Degree of periportal necrosis
- B. Portal fibrosis
- C. Intralobular necrosis
- D. Degree of portal inflammation

Grade, a histologic assessment of necroinflammatory activity, is done by examination of liver biopsy. It includes assessment of degree of periportal necrosis, degree of hepatocyte degeneration and focal necrosis within lobule and degree of portal inflammation.

953 What percentage of HBV infection acquired at birth will become chronic ?

Harrison's 18th Ed. 2568

- A. 10 %
- B. 40 %
- C. 75 %
- D. 90 %

HBV infection at birth is associated with clinically silent acute infection but a 90% chance of chronic infection.

954 What percentage of HBV infection acquired in immunocompetent young adulthood will become chronic ?

Harrison's 18th Ed. 2568

- A. ~ 1 %
- B. ~ 4 %
- C. ~ 7 %
- D. ~ 9 %

HBV infection in immunocompetent young adulthood carry a risk of chronicity of ~ 1%.

955 Which of the following has prognostic importance among adults with chronic hepatitis B ?

Harrison's 18th Ed. 2568

- A. HBV replication

- B. HLA DR3 or DR4 markers
- C. AST and ALT
- D. Liver histology

Among adults with chronic hepatitis B, histologic features are of prognostic importance. Distinctions in HBV replication and in histologic category do not always coincide.

956 Replicative phase of chronic HBV infection is characterized by ?

Harrison's 18th Ed. 2568

- A. Presence of HBeAg in serum
- B. HBV DNA levels $> 10^5 - 10^6$ virions/mL
- C. Presence of HBcAg in liver
- D. All of the above

Replicative phase is characterized by presence of HBeAg & HBV DNA levels over $10^5 - 10^6$ virions/mL in serum, by presence of HBcAg in liver, by high infectivity & by accompanying liver injury.

957 Nonreplicative phase of chronic HBV infection is characterized by all except ?

Harrison's 18th Ed. 2568

- A. Absence of HBeAg in serum
- B. HBV DNA levels $< 10^3$ virions/mL
- C. Presence of anti-HBe
- D. Presence of HBcAg in liver

Nonreplicative phase is characterized by the absence of the conventional serum marker of HBV replication (HBeAg), the appearance of anti-HBe, levels of HBV DNA below a threshold of $\sim 10^3$ virions/mL, the absence of intrahepatocytic HBcAg, limited infectivity, and minimal liver injury.

958 What percentage of HBeAg-reactive chronic hepatitis B convert spontaneously from replicative to nonreplicative infection per year ?

Harrison's 18th Ed. 2569

- A. $\sim 2 - 5\%$
- B. $\sim 5 - 10\%$
- C. $\sim 10 - 15\%$
- D. $\sim 20 - 30\%$

$\sim 10-15\%$ patients of HBeAg-reactive chronic hepatitis B convert spontaneously from relatively replicative to nonreplicative infection per year.

959 Most important risk factor for development of cirrhosis & HCC in chronic HBV infection is ?

Harrison's 18th Ed. 2569

- A. Levels of HBV DNA
- B. Level of HBV replication
- C. Levels of aminotransferase activity
- D. All of the above

Level of HBV replication is the most important risk factor for the ultimate development of cirrhosis & HCC in both HBeAg-reactive and HBeAg-negative patients.

960 HBV inactive carriers is characterized by all except ?

Harrison's 18th Ed. 2569

- A. Circulating HBsAg
- B. Raised serum aminotransferase levels
- C. Undetectable HBeAg
- D. Almost undetectable levels of HBV DNA

Inactive HBV carriers have circulating HBsAg, normal serum aminotransferase levels, undetectable HBeAg, and almost undetectable levels of HBV DNA.

961 Which of the following is not a complication of chronic hepatitis B ?

Harrison's 18th Ed. 2569

- A. Hyperglobulinemia
- B. Immune-complex glomerulonephritis
- C. Generalized vasculitis
- D. Leukocytoclastic vasculitis

Hyperglobulinemia & detectable circulating autoantibodies are distinctly absent in chronic hepatitis B in contrast to autoimmune hepatitis.

962 HBV DNA can be detected in serum at levels as low as ?

- A. 20 IU/mL
- B. 40 IU/mL
- C. 60 IU/mL
- D. 80 IU/mL

HBV DNA can be detected in the serum at levels as low as 60 IU/mL.

963 Histologic improvement is defined as a reduction of 2 or more points in the histologic activity index at ?

N Engl J Med 2008;359:1486-500

- A. Month 3
- B. Month 6
- C. Year 1
- D. Year 2

964 Serum HBV DNA undetectable by PCR is defined as ?

N Engl J Med 2008;359:1486-500

- A. < 100 to 200 copies per milliliter
- B. < 300 to 400 copies per milliliter
- C. < 500 to 1000 copies per milliliter
- D. < 1000 to 2000 copies per milliliter

Serum HBV DNA undetectable by PCR is defined as < 300 to 400 copies per milliliter (< 1000 copies / mL for adefovir) at the end of year 1.

965 Immunity to HBV infection is characterized by all except ?

- A. Loss of HBV surface antigen
- B. Loss of HBV e antigen
- C. Loss of anti-core antigen IgM
- D. Loss of anti-core antigen IgG

Immunity to HBV infection is characterized by loss of HBV surface antigen, DNA, e antigen, & anti-core antigen IgM with development of anti-surface antigen antibody & anti-core antigen IgG (total anti-core antigen antibody).

966 Which of the following differentiates natural immunity by resolved HBV infection from that which is acquired through vaccination ?

- A. Presence of Anti HBs + IgM anti HBc
- B. Presence of Anti HBs + IgG anti HBc
- C. Presence of Anti HBs + anti HBe
- D. All of the above

Presence of anti HBs & IgG anti Hbc together differentiates natural immunity through resolved infection from that which is acquired through vaccination, which is denoted by isolated anti-surface antigen antibody.

967 Which of the following phase is seen almost exclusively in those who acquired HBV infection vertically or during early childhood ?

- A Immune tolerance phase
- B Immune clearance phase
- C Inactive carrier phase
- D Reactivation phase

Immune tolerance phase, the initial phase of chronic HBV infection, is seen almost exclusively in those who acquired HBV infection vertically or during early childhood.

968 Predictor of spontaneous e antigen seroconversion is ?

- A Old age
- B Elevated ALT level
- C Acute exacerbation
- D All of the above

The strongest predictors of spontaneous e antigen seroconversion are old age, an elevated ALT level, and an acute exacerbation.

969 Which of the following phase is also called HBV e antigen negative chronic hepatitis ?

- A Immune tolerance phase
- B Immune clearance phase
- C Inactive carrier phase
- D Reactivation phase

Reactivation phase is also termed as HBV e antigen negative chronic hepatitis.

970 Liver biopsy findings are normal or nonspecific in which of the following phase of HBV infection ?

- A Immune tolerance phase
- B Immune clearance phase
- C Inactive carrier phase
- D Reactivation phase

Liver biopsy shows findings of chronic hepatitis in immune clearance and reactivation phase. Nonsignificant hepatitis is observed in inactive carrier phase.

971 e antibody is positive in which of the following phase of HBV infection ?

- A Immune tolerance phase
- B Immune clearance phase
- C Inactive carrier phase
- D All of the above

e antibody is negative in immune tolerance and immune clearance phase.

972 HBV DNA is high in which of the following phase of HBV infection ?

- A Immune tolerance phase
- B Immune clearance phase
- C Inactive carrier phase
- D Reactivation phase

973 Inactive HBV carriers with a low risk of clinical progression are those with a serum HBV DNA level below ?

N Engl J Med 2008;359:1486-500

- A 1000 IU per milliliter
- B 5000 IU per milliliter
- C 10000 IU per milliliter
- D 10000 IU per milliliter

Persons with a serum HBV DNA level below 1000 IU per milliliter and a normal ALT level consistently are considered to be inactive carriers with a low risk of clinical progression.

974 Which of the following drug is beneficial in severe acute hepatitis B ?

Harrison's 17th Ed. 1946

- A Lamivudine
- B Interferon monotherapy
- C Ribavirin
- D Glucocorticoid

In severe acute hepatitis B, lamivudine has been successful, although it is not an approved indication for lamivudine therapy.

975 Which of the following is approved for treatment of chronic HBV infection ?

Harrison's 18th Ed. 2569, Lancet Infect Dis 2005;5:374-82

- A PEG IFN
- B Adefovir
- C Entecavir
- D All of the above

To date, seven drugs have been approved for treatment of chronic hepatitis B: PEG IFN, lamivudine, adefovir dipivoxil, entecavir, telbivudine, and tenofovir.

976 Which of the following drugs was the first to be approved for treatment of chronic HBV infection ?

Harrison's 18th Ed. 2570, Lancet Infect Dis 2005;5:374-82

- A Interferon α
- B Lamivudine
- C Adefovir
- D Entecavir

IFN- α was the first approved therapy for chronic hepatitis B.

977 IFN-a therapy is not effective in which of the following groups of CHB patients ?

Harrison's 18th Ed. 2570

- A Very young children infected at birth
- B Immunosuppressed persons
- C Decompensated chronic hepatitis B
- D All of the above

IFN therapy has not been effective in very young children infected at birth, in immunosuppressed persons, Asian patients with minimal-to-mild ALT elevations, or patients with decompensated chronic hepatitis B.

978 Which of the following side effects of IFN- α therapy is not reversible upon dose lowering or cessation of therapy ?

Harrison's 18th Ed. 2570

- A Autoimmune thyroiditis
- B Bone marrow suppression
- C Alopecia
- D Numbness & tingling of extremities

Except autoimmune thyroiditis, all side effects are reversible upon dose lowering or cessation of IFN- α therapy.

979 Which of the following is not a 'Nucleoside analogue' ?

Harrison's 18th Ed. 2570, Lancet Infect Dis 2005;5:374-82

- A Lamivudine
- B Adefovir

- C. Entecavir
- D. Emtricitabine

Adefovir dipivoxil and Tenofovir are nucleotide analogues. Lamivudine - nucleoside analogue, Entecavir - guanosine analogue polymerase inhibitor, Telbivudine - cytosine analogue, Emtricitabine - fluorinated cytosine analogue, Clevudine - pyrimidine nucleoside analogue.

980 Which of the following statements about lamivudine is false ?

Harrison's 18th Ed. 2570, Lancet Infect Dis 2005;5:374-82

- A. Anti-HIV & anti-HBV activity
- B. Dose lower for blocking HIV replication than HBV replication
- C. Not be used as monotherapy in HBV/HIV co-infected patients
- D. Anti-HBe seroconversion occurs in minority of patients

981 The inhibitory dose of Lamivudine for treating HBV/HIV co-infected patients is ?

Harrison's 18th Ed. 2571, Lancet Infect Dis 2005;5:374-82

- A. 100 mg/day
- B. 200 mg/day
- C. 300 mg/day
- D. 400 mg/day

The inhibitory dose of Lamivudine for blocking HBV replication is 100 mg/day. 300 mg/day should be given when treating HBV/HIV co-infected patients, and should always be combined with at least two other anti-HIV agents.

982 Long-term monotherapy with lamivudine is associated with mutation in which motif of HBV DNA polymerase ?

Harrison's 18th Ed. 2571

- A. Chemokine (C-C motif) receptor 6
- B. RNA-binding motif (RBM)
- C. YMDD
- D. All of the above

Long-term monotherapy with lamivudine is associated with methionine-to-valine (M204V) or methionine-to-isoleucine (M204I) mutations, primarily at amino acid 204 in the tyrosine-methionine-aspartate-aspartate (YMDD) motif of HBV DNA polymerase.

983 Which of the following antiviral drugs has dual antiviral activity against HBV & HIV ?

Harrison's 18th Ed. 2571, Lancet Infect Dis 2005;5:374-82

- A. Enfuvirtide
- B. Emtricitabine
- C. Adefovir
- D. Entecavir

984 Which of the following antiviral drugs has dual antiviral activity against HBV & HIV ?

Harrison's 18th Ed. 2571, Lancet Infect Dis 2005;5:374-82

- A. Tenofovir
- B. Emtricitabine
- C. Lamivudine
- D. All of the above

Besides lamivudine, tenofovir and emtricitabine have antiviral activity against HBV & HIV.

985 Which of the following is false for HBV treatment in HIV positive patient ?

Lancet Infect Dis 2005;5:374-82

- A. Response to Interferon α is lower
- B. Indefinite treatment with nucleoside/nucleotide analogues

- C. Co-infection with hepatitis C rare
- D. Frequent "Flares" while on HAART

986 Which of the following has the highest rates of co-infection with HBV & HIV ?

Lancet Infect Dis 2005;5:374-82

- A. Men who have sex with men
- B. Intravenous drug users
- C. Infection through heterosexual contacts
- D. Blood transfusion

987 Markers of successful anti HBV therapy include ?

N Engl J Med 2004;350:1118-29

- A. Loss of HBeAg
- B. Seroconversion to anti-HBe antibodies
- C. Reduction of circulating viral load
- D. All of the above

988 In CHB, factor that is not predictive of a response to antiviral therapy is ?

Harrison's 18th Ed. 2572, N Engl J Med 2008;359:1492

- A. Low ALT level
- B. Low HBV DNA level
- C. Mild-to-moderate histologic activity and stage
- D. HBV genotype A>B>C>D

Factors that are most predictive of a response include a high ALT level, a low HBV DNA level, and mild-to-moderate histologic activity & stage. Likelihood of HBeAg loss in PEG IFN α -2b treated HBeAg-reactive patients is associated with HBV genotype A > B > C > D.

989 For HBeAg-reactive chronic HBV infection, antiviral therapy is indicated for patients with ?

N Engl J Med 2008;359:1492

- A. ALT level more than two times upper limit of normal
- B. HBV DNA > 20,000 IU per milliliter
- C. Risk factors for progression
- D. All of the above

For HBeAg-reactive chronic HBV, antiviral therapy is indicated if ALT levels are more than twice the upper limit of normal and HBV DNA >20,000 IU/mL. Risk factors for progression (older than 40 years, family history of HCC, or ALT level in high normal range (up to twice the upper limit of normal)).

990 For HBeAg-negative chronic HBV infection, antiviral therapy is indicated for patients with ?

N Engl J Med 2008;359:1492

- A. ALT level more than two times upper limit of normal
- B. HBV DNA > 20,000 IU per milliliter
- C. Moderate-to-severe necroinflammatory activity or fibrosis
- D. All of the above

For HBeAg-negative chronic HBV, antiviral therapy is indicated if ALT levels are more than twice the upper limit of normal and HBV DNA >20,000 IU/mL. If ALT is <2X with HBV DNA >20,000 IU/mL, liver biopsy is indicated. Moderate-to-severe necroinflammatory activity or fibrosis favours antiviral therapy.

991 Conversion factor for HBV DNA between international units (IU) per milliliter and copies per milliliter is about ?

N Engl J Med 2008;359:1492

- A. 2.6
- B. 3.6
- C. 4.6

D. 5.6

Conversion factor HBV DNA between international units /mL & copies/mL is ~ 5.6 (1 IU/mL is ~ 5.6 copies/mL). Treatment thresholds in copies/mL are 5 times higher than international units/mL.

992 Nephrotoxicity of adefovir is best related to ?

Therapeutic Advances in Gastroenterology 2008; 1; 61-75

- A. Acute glomerulonephritis
- B. Goodpasture's syndrome
- C. Fanconi-like syndrome
- D. All of the above

Adefovir at 30mg has higher antiviral potency. It's potential nephrotoxicity manifests as a Fanconi-like syndrome with phosphaturia and proteinuria.

993 PEG stands for ?

Harrison's 18th Ed. 2581

- A. Polyethylene glycerol
- B. Perethylene glycerol
- C. Polyethylene glycol
- D. Perethylene glycol

Pegylated interferon (PEG IFN) is a long-acting IFN bound to polyethylene glycol (PEG).

994 Pegylated IFN-a was approved by FDA for chronic hepatitis B in which year ?

Therapeutic Advances in Gastroenterology 2008; 1; 61-75

- A. 2000
- B. 2002
- C. 2003
- D. 2005

1992 - Interferon alfa (IFN-a), 1998 - Lamivudine (LAM), 2002 - Adefovir (ADV), 2005 - Entecavir (ETV), Pegylated IFN-a, 2006 - Telbivudine (LDT), 2008 - Tenofovir (TDF).

995 The recommended regimen of peg IFNa-2a for CHB is ?

Harrison's 18th Ed. 2572

- A. 180 µg subcutaneously weekly for one month
- B. 180 µg subcutaneously weekly for three months
- C. 180 µg subcutaneously weekly for six months
- D. 180 µg subcutaneously weekly for one year

Recommended regimen for peg IFNa-2a in CHB is 180 µg subcutaneously weekly for one year.

996 Which of the following HBV genotype has the highest rate of IFN-induced HBeAg loss ?

Harrison's 18th Ed. 2572, Therapeutic Advances in Gastroenterology 2008; 1; 61-75

- A. Genotype A
- B. Genotype B
- C. Genotype C
- D. Genotype D

Patients with HBV genotype A have the highest rate of IFN-induced HBeAg loss. Genotype A is most common in North America & Europe. HBeAg clearance associated with nucleos(t)ide analogues is independent of HBV genotype.

997 The most potent of the HBV antivirals is ?

Harrison's 18th Ed. 2573

- A. Entecavir
- B. Telbivudine
- C. Tenofovir
- D. Adefovir Dipivoxil

Entecavir is an oral cyclopentyl guanosine analogue polymerase inhibitor and is the most potent of the HBV antivirals. Its high barrier to resistance coupled with its high potency and an excellent safety profile renders entecavir a first-line drug for patients with chronic hepatitis B.

998 Tenofovir is similar to which of the following ?

Harrison's 18th Ed. 2573

- A. Entecavir
- B. Telbivudine
- C. Tenofovir
- D. Adefovir Dipivoxil

Tenofovir disoproxil fumarate, an acyclic nucleotide analogue similar to adefovir.

999 Which of the following is recommended as first-line therapy in Chronic Hepatitis B ?

Harrison's 18th Ed. 2575

- A. PEG IFN
- B. Entecavir
- C. Tenofovir
- D. All of the above

Among the drugs for hepatitis B, PEG IFN has supplanted standard IFN, entecavir has supplanted lamivudine, and tenofovir has supplanted adefovir. PEG IFN, entecavir, or tenofovir are recommended as first-line therapy.

1000 Therapy with which of the following is least likely to foster emergence of viral mutations ?

Harrison's 18th Ed. 2575

- A. Lamivudine
- B. Tenofovir
- C. Telbivudine
- D. Adefovir

Lamivudine and telbivudine foster the emergence of viral mutations, adefovir somewhat less so, and entecavir (except in lamivudine-experienced patients) and tenofovir rarely at all.

1001 Which of the following should be avoided or used with extreme caution during pregnancy ?

Harrison's 18th Ed. 2576

- A. PEG IFN
- B. Adefovir
- C. Entecavir
- D. All of the above

Except for lamivudine, other antivirals for hepatitis B should be avoided or used with extreme caution during pregnancy.

1002 In patients with HBV-HIV infection, which of the should never be used as monotherapy ?

Harrison's 18th Ed. 2577

- A. Lamivudine
- B. Adefovir
- C. Entecavir
- D. Tenofovir

Lamivudine should never be used as monotherapy in HBV-HIV infection, because HIV resistance emerges rapidly to both viruses. Adefovir, entecavir, Tenofovir and tenofovir + emtricitabine can be used for treating HBV infection in HBV-HIV co-infected patients.

1003 Variables that favour the treatment of HBV/HIV co-infected patients with pegylated interferon are all except ?

Lancet Infect Dis 2005;5:374-82

- A. HBeAg-positive
- B. Elevated aminotransferases
- C. High CD4 counts
- D. Psychiatric disorders

1004 Which of the following antibody is seen in chronic hepatitis D ?

Harrison's 18th Ed. 2577

- A. Anti-LKM1
- B. Anti-LKM2
- C. Anti-LKM3
- D. Anti-LKM4

A distinguishing serologic feature of chronic hepatitis D is the presence in the circulation of anti-LKM3 directed against uridine diphosphate glucuronosyltransferase.

1005 Which of the following antibody is prevalent in patients with chronic hepatitis C virus (HCV) infection ?

Harrison's 18th Ed. 2579

- A. Smooth muscle antibodies (SMA)
- B. Antinuclear (ANA) antibodies
- C. Anti-liver kidney microsomal type 1 (LKM1) antibody
- D. All of the above

Non-organ specific autoantibodies (NOSA), particularly smooth muscle antibodies (SMA) and antinuclear (ANA) antibodies are highly prevalent in patients with chronic hepatitis C virus (HCV) infection. Occasionally, Anti-liver kidney microsomal type 1 (LKM1) antibody, Anti-liver cytosol type 1 (LC1) are found.

1006 Out of the following, which one is the most important as regards progression of liver disease in chronic hepatitis C ?

Harrison's 18th Ed. 2578

- A. Older age
- B. Longer duration of infection
- C. HIV infection
- D. Obesity

Progression of liver disease in chronic hepatitis C is more likely in older age, longer duration of infection, advanced histologic stage and grade, genotype 1, more complex quasispecies diversity, increased hepatic iron, concomitant other liver disorders (alcoholic liver disease, chronic hepatitis B, hemochromatosis, α_1 -antitrypsin deficiency, and steatohepatitis), HIV infection, and obesity. Out of these, duration of infection is the most important. No other epidemiologic or clinical features of chronic hepatitis C (severity of acute hepatitis, level of aminotransferase activity, level of HCV RNA, presence or absence of jaundice during acute hepatitis) are predictive of eventual outcome.

1007 Best prognostic indicator in chronic hepatitis C is ?

Harrison's 18th Ed. 2578

- A. Liver histology
- B. Severity of jaundice
- C. Levels of aminotransferases
- D. HIV status

Best prognostic indicator in chronic hepatitis C is liver histology.

1008 Which of the following is the most common symptom in chronic hepatitis C ?

Harrison's 18th Ed. 2579

- A. Fatigue
- B. Jaundice
- C. Fever
- D. Weight loss

Fatigue is the most common symptom of chronic hepatitis C. Jaundice is rare.

1009 Extrahepatic complications unrelated to immune-complex injury in chronic hepatitis C are all except ?

Harrison's 18th Ed. 2579

- A. Sjögren's syndrome
- B. Porphyria cutanea tarda
- C. Essential mixed cryoglobulinemia
- D. Lichen planus

Essential mixed cryoglobulinemia is an immune complex-mediated extrahepatic complications of chronic hepatitis C. While those unrelated to immune-complex injury are Sjögren's syndrome, lichen planus, porphyria cutanea tarda, type-II diabetes mellitus and metabolic syndrome (including insulin resistance & steatohepatitis).

1010 Which of the following in a laboratory feature of chronic hepatitis C ?

Harrison's 18th Ed. 2579

- A. Fluctuating aminotransferase levels
- B. Jaundice is rare
- C. Circulating anti-LKM1 antibodies
- D. All of the above

1011 Which of the following enhances the efficacy of IFN ?

Harrison's 18th Ed. 2579

- A. Ribavirin
- B. Adefovir
- C. Entecavir
- D. Tenofovir

Oral guanosine nucleoside ribavirin is ineffective when used alone. But, ribavirin enhances the efficacy of IFN by reducing the likelihood of virologic relapse after the achievement of an end-treatment response (ETR).

1012 Rapid virologic response (RVR) is estimated at what time after institution of therapy in Hepatitis C ?

Harrison's 18th Ed. 2579, Figure 306-2

- A. 2 weeks
- B. 4 weeks
- C. 8 weeks
- D. 12 weeks

RVR refers to undetectable HCV RNA at week 4.

1013 Early virologic response (EVR) is estimated at what time after institution of therapy in Hepatitis C ?

Harrison's 18th Ed. 2579, Figure 306-2

- A. 2 weeks
- B. 4 weeks
- C. 8 weeks
- D. 12 weeks

EVR refers to $2 \log^{10}$ HCV RNA reduction by week 12.

1014 Responder status is estimated at what time after institution of therapy in Hepatitis C ?

Harrison's 18th Ed. 2579, Figure 306-2

- A. 12 weeks
- B. 24 weeks
- C. 48 weeks
- D. 72 weeks

1015 Sustained virologic response (SVR) is estimated at what time after institution of therapy in Hepatitis C ?

Harrison's 18th Ed. 2579, Figure 306-2

- A. 12 weeks
- B. 24 weeks
- C. 48 weeks
- D. 72 weeks

1016 Interferon therapy results in activation of ?

Harrison's 18th Ed. 2579

- A. Cytokines
- B. Chemokines
- C. JAKSTAT signal transduction pathway
- D. All of the above

Interferon therapy results in activation of the JAKSTAT signal transduction pathway, which results in the intracellular elaboration of genes & their protein products with antiviral properties. Hepatitis C proteins inhibit JAK-STAT signaling pathway, and exogenous interferon restores expression of interferon-stimulated genes and their antiviral effects.

1017 The current standard treatment of chronic hepatitis C is ?

Harrison's 18th Ed. 2579

- A. PEG IFN
- B. Ribavirin
- C. PEG IFN + Ribavirin
- D. All of the above

The current standard treatment of chronic hepatitis C is the combination of long acting pegylated IFN (PEG IFN) and ribavirin.

1018 Which of the following variable does not correlate favourably in the IFN-based treatment of chronic hepatitis C ?

Harrison's 18th Ed. 2580

- A. Genotypes 2 and 3
- B. Genotypes 1 and 4
- C. Low baseline HCV RNA level
- D. Histologically mild hepatitis

Patient variables that tend to correlate with sustained virologic responsiveness to IFN-based therapy include favorable genotype (genotypes 2 and 3 as opposed to genotypes 1 and 4), low baseline HCV RNA level (<2 million copies/mL, which is equivalent to 800,000 IU/mL), histologically mild hepatitis and minimal fibrosis, age <40, absence of obesity as well as insulin resistance and type-II diabetes mellitus, and female gender. Patients with cirrhosis respond less favourably.

1019 Duration of IFN-ribavirin therapy have in patients with genotype 1 should last for ?

Harrison's 18th Ed. 2580

- A. 12 weeks
- B. 24 weeks
- C. 48 weeks
- D. 72 weeks

1020 Duration of IFN-ribavirin therapy have in patients with genotype 2 and 3 should last for ?

Harrison's 18th Ed. 2580

- A. 12 weeks
- B. 24 weeks
- C. 48 weeks
- D. 72 weeks

Combination IFN-ribavirin therapy in chronic hepatitis C with genotype 1 should for 48 weeks, while in those with genotypes 2 and 3, a 24-week course of therapy suffices.

1021 Which of the following is relevant for patients treated with PEG IFN and ribavirin ?

Harrison's 18th Ed. 2580

- A. SLCO1B1
- B. HLA-B*1501
- C. IL15
- D. IL28B

In studies of patients treated with PEG IFN and ribavirin, variants of the IL28B SNP that code for IFN-3 correlate significantly with responsiveness. Patients homozygous for the C allele at this locus have the highest frequency of achieving an SVR (80%), those homozygous for the T allele at this locus are least likely to achieve an SVR (25%), and those heterozygous at this locus (C/T) have an intermediate level of responsiveness (SVRs in 35%).

1022 The most pronounced side effect of ribavirin therapy is ?

Harrison's 18th Ed. 2580

- A. Seizure
- B. Agranulocytosis
- C. Hemolysis
- D. All of the above

The most pronounced side effect of ribavirin therapy is hemolysis.

1023 Which of the following is a side effect of ribavirin therapy ?

Harrison's 18th Ed. 2580

- A. Pruritus
- B. Gout
- C. Anemia
- D. All of the above

1024 Half-life in serum of Hepatitis C virion is ?

Harrison's 18th Ed. 2580

- A. 2 - 3 hours
- B. 2 - 3 days
- C. 2 - 3 months
- D. 2 - 3 years

Despite a Hepatitis C virion half-life in serum of only 2 - 3 hours, the level of HCV is maintained by a high replication rate of 10^{12} hepatitis C virions per day.

1025 Elimination time of PEG IFN is how many times longer than standard IFN ?

Harrison's 18th Ed. 2580

- A. Three times
- B. Five times
- C. Seven times
- D. Nine times

For the treatment of chronic hepatitis C, standard IFNs have now been supplanted by PEG IFNs and these have elimination times up to sevenfold longer than standard IFNs.

1026 Standard indication for antiviral therapy of chronic hepatitis C is ?

Harrison's 18th Ed. 2583, Table 306-7

- A. Detectable HCV RNA (with or without elevated ALT)
- B. Portal/bridging fibrosis on liver biopsy
- C. Moderate to severe hepatitis on liver biopsy
- D. All of the above

1027 Antiviral therapy is not recommended in which of the following patients of chronic hepatitis C ?

Harrison's 18th Ed. 2583, Table 306-7

- A. Age > 60 years
- B. Mild hepatitis on liver biopsy
- C. Persons with severe renal insufficiency
- D. All of the above

1028 Which of the following patients of chronic hepatitis C are not candidates for IFN-based antiviral therapy ?

Harrison's 18th Ed. 2583, Table 306-7

- A. Decompensated cirrhosis
- B. Pregnancy
- C. Contraindications to use of interferon or ribavirin
- D. All of the above

Patients with decompensated cirrhosis are not candidates for IFN-based antiviral therapy but should be referred for liver transplantation. Interferons are antiproliferative and ribavirin is teratogenic.

1029 Duration of PEG IFN / ribavirin therapy in chronic hepatitis C of genotypes 1 and 4 is ?

Harrison's 18th Ed. 2583, Table 306-7

- A. 12 weeks
- B. 24 weeks
- C. 48 weeks
- D. 72 weeks

1030 Duration of PEG IFN / ribavirin therapy in chronic hepatitis C of genotypes 2 and 3 is ?

Harrison's 18th Ed. 2583, Table 306-7

- A. 12 weeks
- B. 24 weeks
- C. 48 weeks
- D. 72 weeks

1031 Dose of PEG IFN α -2a is ?

Harrison's 18th Ed. 2583, Table 306-7

- A. 180 μ g daily subcutaneously
- B. 180 μ g weekly subcutaneously
- C. 180 μ g daily intramuscularly
- D. 180 μ g weekly intramuscularly

Two PEG IFNs are available: PEG IFN α -2b and α -2a. PEG IFN α -2a is given 180 μ g weekly subcutaneously.

1032 Dose of PEG IFN α -2b is ?

Harrison's 18th Ed. 2583, Table 306-7

- A. 0.5 μ g / kg weekly subcutaneously
- B. 1.5 μ g / kg weekly subcutaneously
- C. 2.5 μ g / kg weekly subcutaneously
- D. 3.5 μ g / kg weekly subcutaneously

PEG IFN α -2b is given 1.5 μ g / kg weekly subcutaneously.

1033 Which of the following is recommended for the success of therapy with PEG IFN / ribavirin in chronic hepatitis C ?

Harrison's 18th Ed. 2582

- A. HCV genotype should be determined prior to therapy
- B. Measure HCV RNA at 12 weeks
- C. Pretreatment liver biopsy
- D. All of the above

1034 Which of the following is advocated in those who have not responded to treatment with PEG IFN / ribavirin in chronic hepatitis C ?

Harrison's 18th Ed. 2584

- A. Longer duration of treatment
- B. Higher doses of either PEG IFN, ribavirin, or both
- C. Switching to a different IFN preparation
- D. All of the above

For those who have not responded to treatment with PEG IFN / ribavirin in chronic hepatitis C, following may be tried : longer duration of treatment; higher doses of either PEG IFN, ribavirin, or both and switching to a different IFN preparation. However, none of these approaches achieves more than a marginal benefit.

1035 Which of the following associated with hepatitis C may respond to antiviral therapy ?

Harrison's 18th Ed. 2584-85

- A. Essential mixed cryoglobulinemia
- B. Porphyria cutanea tarda
- C. Lichen planus
- D. All of the above

1036 Which of the following drug is beneficial in acute hepatitis C ?

Harrison's 18th Ed. 2579

- A. Lamivudine
- B. Interferon monotherapy
- C. Ribavirin
- D. Glucocorticoid

In acute hepatitis C, interferon monotherapy (3 million units SC three times a week) is beneficial. Long-acting pegylated interferon plus ribavirin is superior to interferon monotherapy.

1037 In fulminant hepatitis, which of the following has been shown to improve survival ?

Harrison's 17th Ed. 1946

- A. Glucocorticoid therapy
- B. Exchange transfusion
- C. Prophylactic antibiotic coverage
- D. Extracorporeal liver-assist devices

Glucocorticoid therapy, exchange transfusion, plasmapheresis, human cross-circulation, porcine liver cross-perfusion, hemoperfusion and extracorporeal liver-assist devices have not been proved to enhance survival. Meticulous intensive care that includes prophylactic antibiotic coverage is one factor that appears to improve survival. Orthotopic liver transplantation also has shown excellent results.

1038 Drugs that have been recommended in acute liver failure are all except ?

- A. Lamivudine
- B. Telbivudine
- C. Adefovir
- D. Entecavir

Nucleoside/nucleotide analogues recommended in acute liver failure are lamivudine, telbivudine and entecavir. Adefovir has a slow action & potential nephrotoxicity. Interferon drugs are contraindicated because they can worsen hepatitis.

Autoimmune hepatitis

1039 Autoimmune hepatitis is a kind of ?

Harrison's 18th Ed. 2585

- A. Acute hepatitis

- B. Subacute hepatitis
- C. Chronic hepatitis
- D. Any of the above

Autoimmune hepatitis is a chronic disorder characterized by continuing hepatocellular necrosis & inflammation, usually with fibrosis, which can progress to cirrhosis & liver failure.

1040 Which of the following is prominent in cases of autoimmune hepatitis ?

Harrison's 18th Ed. 2585

- A. Extrahepatic features of autoimmunity
- B. Serologic abnormalities
- C. Immunologic abnormalities
- D. All of the above

In autoimmune hepatitis, extrahepatic features of autoimmunity & seroimmunologic abnormalities are prominent & supports an autoimmune process in its pathogenesis, though autoantibodies do not occur in all cases.

1041 Which class of serum globulins is elevated in autoimmune hepatitis ?

Harrison's 18th Ed. 2585, N Engl J Med 2006;354:54-66

- A. Alpha globulin
- B. Beta globulin
- C. Gamma globulin
- D. Delta globulin

One characteristic laboratory feature of autoimmune hepatitis is a generalized elevation of serum globulins, particularly gamma globulin and IgG, which are generally 1.2 to 3.0 times normal.

1042 Which of the following virus has been implicated in pathogenesis of autoimmune hepatitis ?

N Engl J Med 2006;354:54-66, Harrison's 17th Ed. 1967

- A. Hepatitis viruses
- B. Measles virus
- C. Epstein-Barr virus
- D. All of the above

Measles virus, hepatitis viruses, cytomegalovirus, and Epstein-Barr virus have been implicated as initiators of autoimmune hepatitis in genetically predisposed. Most evidence is related to hepatitis viruses - A, B, or C.

1043 Which of the following drug has been implicated in pathogenesis of autoimmune hepatitis ?

N Engl J Med 2006;354:54-66

- A. Minocycline
- B. Atorvastatin
- C. Interferon
- D. All of the above

Oxyphenisatin, methyl dopa, nitrofurantoin, diclofenac, interferon, pemoline, minocycline & atorvastatin can induce hepatocellular injury that mimics autoimmune hepatitis.

1044 Autoimmune disorder that occur with increased frequency in autoimmune hepatitis patients is ?

Harrison's 18th Ed. 2585

- A. Thyroiditis
- B. Rheumatoid arthritis
- C. Autoimmune hemolytic anemia
- D. All of the above

Autoimmune disorders that occur with increased frequency in autoimmune hepatitis patients are thyroiditis, rheumatoid arthritis, autoimmune hemolytic anemia, ulcerative colitis, membranoproliferative glomerulonephritis, type 1 diabetes mellitus, celiac disease & Sjögren's syndrome.

1045 Which of the following autoantibody is present in patients of autoimmune hepatitis ?

Harrison's 18th Ed. 2586

- A. Antinuclear antibodies (ANAs)
- B. Anti-LKM
- C. Antibodies to soluble liver antigen/liver pancreas antigen
- D. All of the above

Autoantibodies found in autoimmune hepatitis patients are antinuclear antibodies (ANAs), anti-smooth-muscle antibodies (actin), anti-LKM, antibodies to "soluble liver antigen/liver pancreas antigen" (SLA/LP autoantibodies), antibodies to liver-specific asialoglycoprotein receptor ("hepatic lectin").

1046 Which of the following statements about anti soluble liver antigen is false ?

- A. Associated with a more severe disease course
- B. Present in nonhepatic autoimmune disorders
- C. Target of anti-SLA is tRNP^(Ser)Sec
- D. Specific serologic marker for autoimmune liver diseases

Anti-SLA is serologic marker for autoimmune liver diseases, is associated with a more severe disease course, it is virtually absent in nonhepatic autoimmune disorders. Target of anti-SLA is a UGA serine tRNA-associated protein complex [tRNP^(Ser)Sec].

1047 Extrahepatic manifestation of autoimmune hepatitis is ?

Harrison's 18th Ed. 2586

- A. Arthritis
- B. Cutaneous vasculitis
- C. Glomerulonephritis
- D. All of the above

Extrahepatic manifestations of autoimmune hepatitis include arthralgias, arthritis, cutaneous vasculitis and glomerulonephritis.

1048 In autoimmune hepatitis, immunoregulatory dysfunction of which of the following occurs ?

Harrison's 18th Ed. 2586

- A. CD8+CD24+ regulatory T cells
- B. CD8+CD25+ regulatory T cells
- C. CD4+CD24+ regulatory T cells
- D. CD4+CD25+ regulatory T cells

Immunoregulatory dysfunction characterized by decreased numbers of CD4+CD25+ regulatory T cells and decreased levels of scurf, the protein product of FOXP3 gene occurs in autoimmune hepatitis.

1049 Scurfin is the protein product of which gene ?

- A. FOXP1 gene
- B. FOXP2 gene
- C. FOXP3 gene
- D. FOXP4 gene

In autoimmune hepatitis, levels of scurf are decreased. Scurfin is the protein product of FOXP3 gene that is a member of forkhead family of transcription factors.

1050 Type 1 autoimmune hepatitis is associated with which HLA-DR serotype ?

Harrison's 18th Ed. 2586

- A. HLA-DR1
- B. HLA-DR2
- C. HLA-DR3
- D. None of the above

Type I autoimmune hepatitis is associated with HLA-DR3 or HLA-DR4.

1051 Type 2 autoimmune hepatitis is associated with which HLA haplotype ?*Harrison's 18th Ed. 2586*

- A. HLA-DRB1
- B. HLA-DRB2
- C. HLA-DRB3
- D. HLA-DRB4

*Type II autoimmune hepatitis is linked to HLA-DRB1 & HLA-DQB1 haplotypes.***1052 Feature of HLA-DR3 associated autoimmune hepatitis include ?***N Engl J Med 2006;354:54-66*

- A. Early-onset
- B. Severe form
- C. In girls and young women
- D. All of the above

*HLA-DR3-associated disease is more common in the early-onset, severe form of autoimmune hepatitis, which often occurs in girls and young women.***1053 Feature of HLA-DR4 associated autoimmune hepatitis include ?***N Engl J Med 2006;354:54-66*

- A. Common in adults
- B. Extrahepatic manifestations
- C. Better response to corticosteroid therapy
- D. All of the above

*HLA-DR4 associated autoimmune hepatitis is more common in adults and associated with increased incidence of extrahepatic manifestations, milder disease & a better response to corticosteroid therapy.***1054 Type I autoimmune hepatitis is associated with which of the following antibodies ?***Harrison's 18th Ed. 2586*

- A. Antinuclear antibodies (ANA)
- B. Atypical perinuclear antineutrophilic cytoplasmic antibodies
- C. Antiactin antibodies
- D. All of the above

*Type I autoimmune hepatitis is associated with circulating ANAs, autoantibodies against actin, atypical perinuclear antineutrophilic cytoplasmic antibodies (pANCA) & SLA/LP autoantibodies. Antiactin antibodies are more specific for type 1 autoimmune hepatitis. Anti-LKM-1 & anti-LC-1 characterize type 2 disease.***1055 Which of the following is the most specific autoantibody identified in type 1 autoimmune hepatitis ?***Harrison's 18th Ed. 2586, N Engl J Med 2006;354:54-66*

- A. Antiactin antibodies
- B. SLA/LP autoantibodies
- C. Antinuclear antibodies (ANA)
- D. Anti-LKM1

*SLA/LP autoantibodies are the most specific autoantibody identified in type 1 autoimmune hepatitis but is found in only 10 to 30 percent of cases.***1056 Type II autoimmune hepatitis is associated with which of the following antibodies ?***Harrison's 18th Ed. 2586*

- A. Antinuclear antibodies (ANA)
- B. Antiactin antibodies
- C. Anti-LKM1
- D. Atypical perinuclear antineutrophilic cytoplasmic antibodies

1057 Type II autoimmune hepatitis is associated with which of the following antibodies ?*Harrison's 18th Ed. 2586*

- A. Antinuclear antibodies (ANA)
- B. Antiactin antibodies
- C. Anti-liver cytosol 1 (anti-LC-1)
- D. Atypical perinuclear antineutrophilic cytoplasmic antibodies

*Type II autoimmune hepatitis is associated not with ANA but with anti-LKM1. Also seen is autoantibody directed against liver cytosol formiminotransferase cyclodeaminase, a liver-specific 58-kD metabolic enzyme (anti-liver cytosol 1).***1058 In type II autoimmune hepatitis, the anti-LKM1 antibody is directed against which cytochrome ?***Harrison's 18th Ed. 2586*

- A. P450 2D6
- B. P450 2C9
- C. P450 2C19
- D. P450 3A

*In type II autoimmune hepatitis, the anti-LKM1 antibody is directed against cytochrome P450 2D6 (CYP2D6).***1059 Anti-LKM antibody seen in Type II autoimmune hepatitis is also seen in which of the following ?***Harrison's 18th Ed. 2586*

- A. Drug-induced hepatitis
- B. Chronic hepatitis C
- C. Chronic hepatitis D
- D. All of the above

*Anti-LKM1 antibody seen in type II autoimmune hepatitis is seen in some patients with chronic hepatitis C. Anti-LKM2 is seen in drug-induced hepatitis & anti-LKM3 is seen in patients with chronic hepatitis D.***1060 Type III autoimmune hepatitis is associated with which of the following antibodies ?***Harrison's 18th Ed. 2586*

- A. Antinuclear antibodies (ANA)
- B. Antibodies to soluble liver antigen/liver pancreas antigen
- C. Anti-LKM1
- D. All of the above

*Type III autoimmune hepatitis patients lack ANA and anti-LKM1 but have circulating antibodies to soluble liver antigen/liver pancreas antigen.***1061 Which of the following feature goes against the diagnosis of autoimmune hepatitis ?***Harrison's 18th Ed. 2587*

- A. Female gender
- B. Predominant aminotransferase elevation
- C. Mitochondrial antibodies
- D. Globulin level elevation

Features that favour diagnosis of autoimmune hepatitis include female gender, predominant aminotransferase elevation, globulin level elevation, presence of nuclear, smooth muscle, LKM1, and other autoantibodies, concurrent other autoimmune diseases, characteristic histologic features (interface hepatitis, plasma cells, rosettes), HLA DR3 or DR4 markers, & response to treatment. Features against the diagnosis are predominant alkaline phosphatase elevation, mitochondrial antibodies, markers of viral hepatitis, history of hepatotoxic drugs or excessive alcohol, histologic evidence of bile duct injury, or such atypical histologic features as fatty infiltration, iron overload, and viral inclusions. Antimitochondrial antibody (AMA) is the sine qua non of primary biliary cirrhosis (PBC) but may be observed in the so-called overlap syndrome with autoimmune hepatitis.

1062 Which of the following is false about histopathological features of liver in autoimmune hepatitis ?

Harrison's 18th Ed. 2587

- A. Mononuclear-cell infiltrate
- B. Interface hepatitis or piecemeal necrosis
- C. Sparing of the biliary tree
- D. None of the above

Autoimmune hepatitis is characterized by a mononuclear-cell infiltrate (plasma cells + eosinophils) invading the limiting plate (piecemeal necrosis or interface hepatitis). Biliary tree is generally spared and fibrosis is present.

1063 Mainstay of management in autoimmune hepatitis is ?

Harrison's 18th Ed. 2587

- A. Azathioprine
- B. Glucocorticoid
- C. Cyclosporine
- D. Mycophenolate mofetil

Mainstay of management in autoimmune hepatitis is daily glucocorticoid therapy. Azathioprine alone is not effective in achieving remission. Patients refractory to this regimen may be treated with cyclosporine, tacrolimus, or mycophenolate mofetil.

1064 Severe autoimmune hepatitis is defined as ?

Harrison's 18th Ed. 2587

- A. Serum AST $\geq$ 10 times upper limit of normal
- B. Serum AST $\geq$ 5 times upper limit of normal and gamma-globulin level $\geq$ twice normal
- C. Bridging necrosis or multiacinar necrosis on liver biopsy
- D. All of the above

1065 Therapy for autoimmune hepatitis should continue for at least ?

Harrison's 18th Ed. 2587

- A. 3 - 6 months
- B. 6 - 12 months
- C. 12 - 18 months
- D. 18 - 24 months

Therapy for autoimmune hepatitis should continue for at least 12-18 months.

307 - Alcoholic liver disease

1066 Which of the following is the major lesion in the pathology of alcoholic liver disease ?

Harrison's 18th Ed. 2589

- A. Fatty liver
- B. Alcoholic hepatitis
- C. Cirrhosis
- D. All of the above

Major lesions in the pathology of alcoholic liver disease are fatty liver, alcoholic hepatitis & cirrhosis.

1067 Which of the following is considered to be a precursor to cirrhosis ?

Harrison's 18th Ed. 2589

- A. Fatty liver
- B. NASH

- C. Alcoholic hepatitis
- D. All of the above

Alcoholic hepatitis is thought to be a precursor to cirrhosis.

1068 One beer (12 oz), four ounces of wine or one ounce of 80% spirits contain how many grams of alcohol ?

Harrison's 18th Ed. 2589

- A. ~ 8 grams
- B. ~ 10 grams
- C. ~ 12 grams
- D. ~ 14 grams

One beer, four ounces of wine, or one ounce of 80% spirits all contain ~12 grams of alcohol.

1069 In men, what quantity of ethanol produces fatty liver ?

Harrison's 18th Ed. 2589, Table 307-1

- A. 10 - 20 gm / day
- B. 20 - 40 gm / day
- C. 40 - 80 gm / day
- D. 80 - 120 gm / day

In men, 40-80 g/d of ethanol produces fatty liver.

1070 In men, what quantity & duration of ethanol consumption causes hepatitis or cirrhosis ?

Harrison's 18th Ed. 2589, Table 307-1

- A. 80 gm / day for 5 - 10 years
- B. 160 gm / day for 5 - 10 years
- C. 80 gm / day for 10 - 20 years
- D. 160 gm / day for 10 - 20 years

In men, 160 gm / day for 10 - 20 years of ethanol consumption causes hepatitis or cirrhosis.

1071 What proportion of alcoholics develop alcoholic liver disease ?

Harrison's 18th Ed. 2589, Table 307-1

- A. 15 %
- B. 30 %
- C. 45 %
- D. 75 %

Only 15% of alcoholics develop alcoholic liver disease.

1072 Which of the following statements about alcohol consumption is false ?

Harrison's 18th Ed. 2589, Table 307-1

- A. Alcohol is a direct hepatotoxin
- B. Men more susceptible to alcoholic liver injury than women
- C. Alcohol injury does not require malnutrition
- D. 15% of alcoholics develop alcoholic liver disease

Women are more susceptible to alcoholic liver disease than men.

1073 Which of the following is related to the genetic risk factors for alcoholic liver disease ?

Harrison's 18th Ed. 2589, Table 307-1

- A. Cytochrome P450 3A
- B. Cytochrome P450 2C19
- C. Cytochrome P450 2D6

D. Cytochrome P-450 2E1

Genepolymorphisms may include alcohol dehydrogenase, cytochrome P4502E1, and those associated with alcoholism (twin studies).

1074 Cytochrome P-450 2E1 converts alcohol to ?

- A. Acetate
- B. Carbon dioxide
- C. Free fatty acids
- D. Acetaldehyde

In liver, there are two main pathways of alcohol metabolism, alcohol dehydrogenase and cytochrome P-450 2E1. They convert alcohol to acetaldehyde. Acetaldehyde subsequently is metabolized to acetate via acetaldehyde dehydrogenase.

1075 In men, what is the threshold daily alcohol intake necessary to produce pathologic changes of alcoholic hepatitis ?

Harrison's 18th Ed. 2589

- A. 10 grams
- B. 20 grams
- C. 40 grams
- D. 60 grams

Threshold for developing alcoholic liver disease in men is an intake of >60 - 80 gm/day of alcohol for 10 years. Ingestion of 160 gm/day increases risk of developing alcoholic cirrhosis by 25-folds.

1076 Which of the following accelerates progression of alcoholic liver disease to cirrhosis in chronic and excessive drinkers ?

Harrison's 18th Ed. 2589

- A. Acute hepatitis B
- B. Acute hepatitis C
- C. Chronic hepatitis B
- D. Chronic hepatitis C

Chronic infection with hepatitis C (HCV) is an important comorbidity in the progression of alcoholic liver disease to cirrhosis in chronic and excessive drinkers. Alcohol intake also decreases efficacy of interferon-based antiviral therapy in them.

1077 Chronic alcohol ingestion lead to which of the following ?

Harrison's 18th Ed. 2590, Figure 307-1

- A. Autoimmune response
- B. Fibrotic response
- C. Inflammatory response
- D. All of the above

1078 Major enzyme responsible for alcohol metabolism is ?

Harrison's 18th Ed. 2589

- A. Alcohol dehydrogenase
- B. Alcohol reductase
- C. Alcohol oxidase
- D. All of the above

In fatty liver secondary to alcohol induced liver injury, accumulation of fat within the perivenular hepatocytes coincides with the location of alcohol dehydrogenase which is the major enzyme responsible for alcohol metabolism.

1079 Which of the following hepatic pathologic features may be associated with progressive liver injury ?

Harrison's 18th Ed. 2590

- A. Giant mitochondria
- B. Perivenular fibrosis
- C. Macrovesicular fat
- D. All of the above

1080 Histologically, the earliest changes in alcoholic hepatitis are located predominantly in ?

- A. Zone 1
- B. Zone 2
- C. Zone 3
- D. All of the above

Histologically, the earliest changes in alcoholic hepatitis are located predominantly around the central vein i.e. centrilobular (perivenular) areas (zone 3 of Rappaport).

1081 The hallmark features of hepatocyte injury in alcoholic hepatitis are all except ?

Harrison's 18th Ed. 2590

- A. Polymorphonuclear infiltrate
- B. Ballooning degeneration
- C. Mallory bodies
- D. Fibrosis in perisinusoidal space of Disse

Hallmark of alcoholic hepatitis is hepatocyte injury characterized by ballooning degeneration, spotty necrosis, polymorphonuclear infiltrate, and fibrosis in the perivenular and perisinusoidal space of Disse. Mallory bodies are often present in florid cases but are neither specific nor necessary for substantiating diagnosis.

1082 Which of the following is false about Terry's nails ?

- A. Ground glass appearance of fingernails
- B. No lunula
- C. Frequent in severe liver disease
- D. None of the above

Terry's nails refers to finger/toe nails that have a "ground glass" appearance, with no lunula (white crescent-shaped area of finger). It frequently occurs in hepatic failure, cirrhosis, DM, CHF, hyperthyroidism, malnutrition.

1083 Skin texture of cheeks & nasolabial folds in patient with alcohol-related liver disease is called ?

- A. Gooseberry skin
- B. Cheese wind skin
- C. Weather heat skin
- D. Paper-money skin

1084 In alcoholic hepatitis, which of the following can occur in the absence of cirrhosis ?

Harrison's 18th Ed. 2590

- A. Portal hypertension
- B. Ascites
- C. Variceal bleeding
- D. All of the above

In alcoholic hepatitis, portal hypertension, ascites, or variceal bleeding can occur in the absence of cirrhosis. Patients with alcoholic cirrhosis often exhibit clinical features identical to other causes of cirrhosis.

1085 In alcoholic hepatitis, AST : ALT ratio is ?

Harrison's 18th Ed. 2590

- A. > 0.25
- B. > 0.50
- C. > 0.75
- D. > 1

In alcoholic hepatitis, the AST : ALT ratio is >1. AST:ALT ratio is higher in pericentral hepatocytes than other regions in liver lobule & pericentral zone is more selectively affected in acute alcoholic hepatitis.

1086 In alcoholic hepatitis, AST and ALT are rarely more than ?

Harrison's 18th Ed. 2590

- A. 100 IU/L
- B. 200 IU/L
- C. 300 IU/L
- D. 400 IU/L

In alcoholic hepatitis, AST & ALT are usually elevated 2-7 fold. They are rarely >400 IU/L.

1087 Which of the following is a laboratory feature alcoholic fatty liver ?

Harrison's 18th Ed. 2590

- A. Increased gamma-glutamyl transpeptidase (GGTP)
- B. Hypertriglyceridemia,
- C. Hypercholesterolemia
- D. All of the above

1088 Which of the following in ultrasonography indicates serious liver injury with less potential for complete reversal ?

Harrison's 18th Ed. 2590

- A. Portal vein flow reversal
- B. Ascites
- C. Intraabdominal collaterals
- D. All of the above

1089 Discriminant function (DF) formula predicting the outcome of severe alcoholic hepatitis is named after ?

Harrison's 17th Ed. 1971

- A. Nathan
- B. Cushin
- C. Maddrey
- D. George

The discriminant function (DF) formula of Maddrey is based on PT and bilirubin.

1090 Which of the following is the correct formula of Discriminant function (DF) ?

Harrison's 18th Ed. 2590

- A. $2.6 \times \text{PT prolongation} + \text{total S. bilirubin in mg/dL}$
- B. $3.6 \times \text{PT prolongation} + \text{total S. bilirubin in mg/dL}$
- C. $4.6 \times \text{PT prolongation} + \text{total S. bilirubin in mg/dL}$
- D. $5.6 \times \text{PT prolongation} + \text{total S. bilirubin in mg/dL}$

Modified Maddrey's discriminant function predicts prognosis in alcoholic hepatitis. It is calculated as $4.6 \times [\text{prothrombin time} - \text{control value (seconds)}] + \text{serum bilirubin (mg/dl)}$. A value >32 implies poor outcome with one month mortality > 50% if only supportive treatment is given. Cut off value of 32 &/or hepatic encephalopathy has been used as a threshold to consider corticosteroid treatment.

1091 What count of polymorphonuclear cells predicts severe alcoholic hepatitis when discriminant function >32 ?

Harrison's 18th Ed. 2590, Table 307-2

- A. > 500 / μL
- B. > 1500 / μL
- C. > 3500 / μL
- D. > 5500 / μL

1092 Formula for assessment of prognosis of alcoholic hepatitis is ?

- A. Combined clinical & laboratory index of University of Toronto
- B. Model for end-stage liver disease (MELD) score

C. Glasgow alcoholic hepatitis score (GAHS)

D. All of the above

Besides the above ones and also the classical Child-Turcotte-Pugh (CTP) score, Asymmetric dimethylarginine (ADMA) score is the most recently proposed predictor of adverse clinical outcome in patients with severe alcoholic hepatitis.

1093 Variables included in Glasgow alcoholic hepatitis score (GAHS) are all except ?

- A. Age
- B. Hemoglobin
- C. Bilirubin
- D. BUN

Five variables included in GAHS are age, bilirubin, BUN, PT, and TLC. Glasgow Alcoholic Hepatitis score ≥ 9 requires treatment.

1094 MELD score is calculated based on all except ?

N Engl J Med 2009;361:1279-90

- A. Prothrombin time
- B. Serum albumin
- C. Serum creatinine
- D. Serum bilirubin

MELD score is based on a patient's prothrombin time, serum creatinine & bilirubin. Patients with severe alcoholic hepatitis are defined as a discriminant function >32 or MELD >20.

1095 Model for End-Stage Liver Disease (MELD) score was introduced in USA in year ?

N Engl J Med 2009;361:1279-90

- A. 1995
- B. 1998
- C. 2002
- D. 2005

In 2002, MELD score derived from measurements of serum bilirubin, international normalized ratio of prothrombin time and serum creatinine to evaluate pretransplantation renal function was introduced as an aid to organ allocation among candidates for liver transplantation.

1096 Which of the following is advocated for severe alcoholic hepatitis ?

Harrison's 18th Ed. 2591

- A. Glucocorticoids
- B. Thiamine
- C. Proton pump inhibitors
- D. All of the above

Patients with severe alcoholic hepatitis, Women with encephalopathy in particular, should be given prednisone, 40 mg/day, or prednisolone, 32 mg/day, for 4 weeks, followed by a steroid taper.

1097 Use of which of the following improves survival in severe alcoholic hepatitis ?

Harrison's 18th Ed. 2591

- A. Pentoxifylline
- B. Propylthiouracil
- C. Infliximab
- D. Colchicine

The nonspecific TNF inhibitor, pentoxifylline improves survival in severe alcoholic hepatitis is primarily due to a decrease in the development of hepatorenal syndrome.

1098 Use of Infliximab in severe alcoholic hepatitis was stopped due to the increased risk of ?

Harrison's 18th Ed. 2591

- A. Bone marrow suppression
- B. Seizure
- C. Infection
- D. Jaundice

Use of Infliximab in severe alcoholic hepatitis was stopped due to the increased risk of increased deaths secondary to infection and renal failure.

1099 Most liver transplantation centers require alcoholics to have documented abstinence of at least ?

- A. 3 months
- B. 6 months
- C. 9 months
- D. 12 months

Most transplantation centers currently require patients with a history of alcohol abuse to have documented abstinence of at least 6 months before undergoing transplantation ("6-month abstinence rule").

308 - Cirrhosis

1100 Reversal of fibrosis in cirrhosis liver can be achieved with treatment in which of the following diseases ?

Harrison's 18th Ed. 2592

- A. Chronic hepatitis C
- B. Hemochromatosis
- C. Alcoholic liver disease
- D. All of the above

Upon successful treatment of chronic hepatitis C, hemochromatosis and alcoholic liver disease liver fibrosis can be reversed.

1101 The cardinal pathologic features of cirrhosis liver are ?

Harrison's 18th Ed. 2592

- A. Irreversible chronic injury of hepatic parenchyma
- B. Extensive fibrosis
- C. Formation of regenerative nodules
- D. All of the above

The cardinal pathologic features reflect irreversible chronic injury of the hepatic parenchyma and include extensive fibrosis in association with the formation of regenerative nodules.

1102 The pathologic features of cirrhosis liver result from ?

Harrison's 18th Ed. 2592

- A. Hepatocyte necrosis
- B. Destruction of the supporting reticulin network
- C. Distortion of the vascular bed
- D. All of the above

The pathologic features result from hepatocyte necrosis, collapse of the supporting reticulin network with subsequent connective tissue deposition, distortion of the vascular bed, and nodular regeneration of remaining liver parenchyma.

1103 Central event leading to hepatic fibrosis in cirrhosis liver is ?

Harrison's 18th Ed. 2592

- A. Activation of the hepatic stellate cell
- B. Activation of the CD 8+ cells
- C. Activation of Kupffer cells
- D. All of the above

The central event leading to hepatic fibrosis is activation of the hepatic stellate cell resulting in the formation of increased amounts of collagen and other components of the extracellular matrix.

1104 In cirrhosis liver, activated hepatic stellate cells transform into ?

Harrison's 16th Ed. 1858

- A. Elastic tissue
- B. Lymphoid tissue
- C. Myofibroblasts
- D. Hepatocytes

1105 In cirrhosis liver, the stellate cell produces ?

Harrison's 16th Ed. 1858

- A. Fibril-forming type I collagen
- B. Fibril-forming type II collagen
- C. Fibril-forming type III collagen
- D. Fibril-forming type IV collagen

1106 In cirrhosis liver, which of the following leads hepatic stellate cells to produce collagen ?

Harrison's 16th Ed. 1858

- A. TNF α
- B. Insulin
- C. Transforming growth factor β (TGF- β)
- D. Erythropoietin

Upon activation by factors released by hepatocytes and Kupffer cells, the stellate cell assumes a myofibroblast-like conformation and, under the influence of cytokines like transforming growth factor β (TGF- β), produces fibril-forming type I collagen.

1107 Alcohol induced liver injury refers to ?

Harrison's 18th Ed. 2592

- A. Cirrhosis liver
- B. Alcoholic fatty liver
- C. Alcoholic hepatitis
- D. All of the above

Alcohol-induced liver injury includes consequences resulting from chronic alcohol ingestion like alcoholic fatty liver, alcoholic hepatitis and alcoholic cirrhosis.

1108 Hepatic fibrosis secondary to chronic alcohol use is ?

Harrison's 18th Ed. 2592

- A. Centrilobular
- B. Pericellular
- C. Periportal
- D. Any of the above

Chronic alcohol use can produce fibrosis in the absence of accompanying inflammation and/or necrosis. Fibrosis can be centrilobular, pericellular, or periportal.

1109 The diameter of nodules in alcoholic cirrhosis is ?

Harrison's 18th Ed. 2592

- A. < 0.5 mm
- B. < 1 mm
- C. < 2 mm
- D. < 3 mm

In alcoholic cirrhosis, nodules are usually <3 mm in diameter (micronodular). With cessation of alcohol use, larger nodules may form, resulting in a mixed micronodular and macronodular cirrhosis.

1110 Ethanol is mainly absorbed by ?*Harrison's 18th Ed. 2592*

- A. Stomach
- B. Small intestine
- C. Large intestine
- D. All of the above

*Ethanol is mainly absorbed by small intestine and to a lesser degree through stomach.***1111 Which of the following initiates alcohol metabolism ?***Harrison's 18th Ed. 2592*

- A. Cytosolic alcohol dehydrogenase (ADH)
- B. Microsomal-oxidizing system (MEOS)
- C. Peroxisomal catalase
- D. Gastric alcohol dehydrogenase (ADH)

*Gastric alcohol dehydrogenase (ADH) initiates alcohol metabolism.***1112 Enzyme system for metabolism of alcohol in the liver is ?***Harrison's 18th Ed. 2592*

- A. Cytosolic alcohol dehydrogenase (ADH)
- B. Microsomal ethanol oxidizing system (MEOS)
- C. Peroxisomal catalase
- D. All of the above

*Three enzyme systems metabolise alcohol in liver. These are cytosolic ADH, the microsomal-oxidizing system (MEOS), and peroxisomal catalase.***1113 Ethanol is oxidized to acetaldehyde by ?***Harrison's 18th Ed. 2592*

- A. Cytosolic alcohol dehydrogenase (ADH)
- B. Microsomal-oxidizing system (MEOS)
- C. Peroxisomal catalase
- D. Gastric alcohol dehydrogenase (ADH)

*Majority of ethanol oxidation occurs via ADH to form acetaldehyde.***1114 Which out of the following is a highly reactive molecule ?***Harrison's 18th Ed. 2592*

- A. Alcohol
- B. Acetaldehyde
- C. Acetate
- D. All of the above

*Ethanol oxidation occurs via ADH to form acetaldehyde which is metabolized to acetate by aldehyde dehydrogenase (ALDH). Acetaldehyde combines with proteins to form protein-acetaldehyde adducts that lead to hepatocyte damage like interference with specific enzyme activities (microtubular formation & hepatic protein trafficking), Kupffer cell activation. As a result, profibrogenic cytokines are produced that initiate and perpetuate stellate cell activation, with the resultant production of excess collagen and extracellular matrix.***1115 In alcoholic cirrhosis, clinical findings include ?***Harrison's 18th Ed. 2593*

- A. Palmar erythema
- B. Spider angiomas
- C. Lacrimal gland enlargement
- D. All of the above

1116 In alcoholic cirrhosis, clinical findings include all except ?*Harrison's 18th Ed. 2593*

- A. Clubbing of fingers

- B. Muscle wasting
- C. Signs of virilization in women
- D. Xanthoma

1117 Which of the following findings are associated with alcoholism but are not specifically related to cirrhosis ?*Harrison's 18th Ed. 2593*

- A. Palmar erythema
- B. Spider angiomas
- C. Gynecomastia
- D. Dupuytren's contractures

*Frequent findings in alcoholic cirrhosis include jaundice, palmar erythema, spider angiomas, parotid and lacrimal gland enlargement, clubbing of fingers, splenomegaly, muscle wasting, and ascites with or without peripheral edema. Increased peripheral formation of estrogen due to diminished hepatic clearance of the precursor androstenedione leads to gynecomastia, testicular atrophy and decreased body hair in men. In women, signs of virilization or menstrual irregularities may occur. Dupuytren's contractures resulting from fibrosis of the palmar fascia with resulting flexion contracture of digits are associated with alcoholism but are not specifically related to cirrhosis.***1118 Zieve's syndrome in alcoholics is best related to ?***Harrison's 18th Ed. 2593*

- A. Diarrhoea
- B. Myocardial infarction
- C. Hemolytic anemia
- D. Pneumonia

*ZS is an acute metabolic condition that can occur during withdrawal from prolonged alcohol abuse. It consists of hemolytic anemia (spur cells and acanthocytes), hyperlipoproteinaemia, jaundice, and abdominal pain. The underlying cause is liver delipidization.***1119 Which of the following presentation result from both hepatocellular insufficiency and portal hypertension ?***Harrison's 18th Ed. 2593*

- A. Ascites
- B. Jaundice
- C. Coagulopathy
- D. Splenomegaly

1120 Which of the following presentation result from both hepatocellular insufficiency and portal hypertension ?*Harrison's 18th Ed. 2593*

- A. Splenomegaly
- B. Jaundice
- C. Coagulopathy
- D. Hepatic encephalopathy

*Jaundice, edema, coagulopathy, and certain metabolic abnormalities are due to loss of functioning hepatocellular mass. Gastroesophageal varices and splenomegaly are due to portal hypertension. Ascites & hepatic encephalopathy result from both hepatocellular insufficiency & portal hypertension.***1121 Alcoholic cirrhosis is also called ?***Harrison's 17th Ed. 1972*

- A. Gaucher's cirrhosis
- B. Johnson's cirrhosis
- C. Gilbert's cirrhosis
- D. Laennec's cirrhosis

Alcoholic cirrhosis, historically referred to as Laennec's cirrhosis is the most common type of cirrhosis encountered in North America, western Europe and South America.

1122 Loss of liver cells in alcoholic cirrhosis is ?*Harrison's 17th Ed. 1972*

- A. Uniform
- B. Patchy
- C. Lobe specific
- D. All of the above

Alcoholic cirrhosis is characterized by diffuse fine scarring, fairly "uniform" loss of liver cells, and small regenerative nodules, and is called micronodular cirrhosis.

1123 Micronodular cirrhosis result from ?*Harrison's 17th Ed. 1972*

- A. Gall bladder stones
- B. Following jejunoileal bypass
- C. Following gastrectomy
- D. Chronic pancreatitis

Micronodular cirrhosis may result following jejunoileal bypass & thus alcoholic cirrhosis & micronodular cirrhosis are not synonymous. Alcoholic cirrhosis may progress to macronodular cirrhosis with time.

1124 In cirrhosis liver, cell loss generally ?*Harrison's 17th Ed. 1972*

- A. Lags replacement
- B. Exceeds replacement
- C. Equals replacement
- D. Any of the above

With continued alcohol intake and destruction of hepatocytes, fibroblasts, activated hepatic stellate cells and myofibroblasts appear at the site of injury and deposit collagen forming septa in periportal and pericentral zones surrounding remaining liver cells, which regenerate and form nodules. The cell loss generally exceeds replacement.

1125 In alcoholics, which concomitant hepatitis infection accelerates development of alcoholic cirrhosis ?*Harrison's 18th Ed. 2593*

- A. Acute hepatitis A
- B. Acute hepatitis B
- C. Chronic hepatitis B
- D. Chronic hepatitis C

Concomitant chronic hepatitis C virus (HCV) infection significantly accelerates development of alcoholic cirrhosis.

1126 In alcoholic cirrhosis, liver size may be ?*Harrison's 17th Ed. 1972*

- A. Enlarged
- B. Normal
- C. Decreased
- D. All of the above

In alcoholic cirrhosis, liver may be either enlarged, normal, or decreased in size. With continuing hepatocyte destruction and collagen deposition, the liver shrinks in size, acquires a nodular appearance, and becomes hard as 'end-stage' cirrhosis develops.

1127 Anemia in alcoholic cirrhosis may be due to ?*Harrison's 18th Ed. 2593*

- A. Acute/chronic GI blood loss
- B. Coexistent folic acid & vitamin B₁₂ deficiency
- C. Hypersplenism
- D. All of the above

1128 Anemia in alcoholic cirrhosis may be due to ?*Harrison's 18th Ed. 2593*

- A. Psychogenic factors
- B. Direct suppressive effect of alcohol on bone marrow
- C. Deficiency of iron
- D. All of the above

Anemia results from acute & chronic gastrointestinal blood loss, coexistent folic acid & vitamin B12 deficiency, hypersplenism, & suppressive effect of alcohol on bone marrow.

1129 Laboratory finding unusual in alcoholic cirrhosis is ?*Harrison's 18th Ed. 2593*

- A. Hemolytic anemia
- B. Hyperbilirubinemia
- C. Elevated serum alkaline phosphatase
- D. Serum AST levels > 300 units

Hemolytic anemia due to effects of hypercholesterolemia or erythrocyte membranes resulting in unusual spurlike projections (acanthocytosis) may occur. Hyperbilirubinemia is found in association with elevated serum alkaline phosphatase levels. Levels of serum AST are frequently elevated, but levels > 300 units are unusual.

1130 Levels of serum AST in alcoholic cirrhosis are ?*Harrison's 18th Ed. 2593*

- A. < 300 units
- B. < 400 units
- C. < 500 units
- D. < 600 units

In alcoholic cirrhosis, levels of serum AST are frequently elevated but levels > 300 units are unusual and should prompt one to look for other coincident or complicating factors.

1131 In alcoholic liver disease, AST / ALT ratio is ?*Harrison's 18th Ed. 2593*

- A. > 0.5
- B. > 1.0
- C. > 1.5
- D. > 2.0

1132 In alcoholic liver disease, AST levels > ALT are due to ?*Harrison's 18th Ed. 2593*

- A. Greater inhibition of ALT synthesis by ethanol
- B. Greater production of AST by ethanol
- C. Greater clearance of ALT by ethanol
- D. Lesser clearance of AST by ethanol

In alcoholic liver disease & in contrast to viral hepatitis, serum AST is usually disproportionately elevated relative to ALT (AST/ALT ratio >2) due to proportionally greater inhibition of ALT synthesis by ethanol which may be partially reversed by pyridoxal phosphate.

1133 Altered albumin/globulin ratio in alcoholic cirrhosis is due to ?*Harrison's 18th Ed. 2593*

- A. Hypoalbuminemia due to impaired hepatic protein synthesis
- B. Hyperglobulinemia due to stimulation of RE system
- C. A+B
- D. None of the above

The serum albumin level is usually depressed, while serum globulins are increased. Hypoalbuminemia reflects impairment in hepatic protein synthesis, while hyperglobulinemia result from nonspecific stimulation of reticuloendothelial system.

1134 Metabolic disturbances seen in alcoholic cirrhosis are all except ?

Harrison's 18th Ed. 2593

- A. Glucose intolerance
- B. Respiratory alkalosis
- C. Metabolic alkalosis
- D. Prerenal azotemia

1135 Metabolic disturbances seen in alcoholic cirrhosis are all except ?

Harrison's 18th Ed. 2593

- A. Hypomagnesemia
- B. Hyperphosphatemia
- C. Dilutional hyponatremia
- D. Hypokalemia

In cirrhosis, glucose intolerance due to endogenous insulin resistance may be present, however clinical diabetes is uncommon. Central hyperventilation leads to respiratory alkalosis. Dietary deficiency and increased urinary losses lead to hypomagnesemia and hypophosphatemia. In patients with ascites and dilutional hyponatremia, hypokalemia may occur from increased urinary potassium losses due in part to hyperaldosteronism. Prerenal azotemia is also observed in such patients.

1136 What percentage of individuals with excessive alcohol intake develop cirrhosis ?

Harrison's 18th Ed. 2593

- A. 5 to 10 %
- B. 10 to 15 %
- C. 20 to 25 %
- D. 30 to 35 %

Alcoholic cirrhosis should be strongly suspected in patients with a history of prolonged or excessive alcohol intake and physical signs of chronic liver disease. Only 10 to 15% of individuals with excessive alcohol intake develop cirrhosis, therefore other causes & types of liver disease should be considered.

1137 Complicating conditions that can deteriorate clinical status of an otherwise stable cirrhotic patient include ?

Harrison's 17th Ed. 1972

- A. Infection
- B. Portal vein thrombosis
- C. Hepatocellular carcinoma
- D. All of the above

When clinical status of an otherwise stable cirrhotic patient deteriorates without an obvious explanation, complicating conditions like infection, portal vein thrombosis & hepatocellular carcinoma, should be looked for.

1138 Which of the following about alcoholic cirrhosis is true ?

Harrison's 17th Ed. 1973

- A. Glucocorticoids are helpful in severe alcoholic hepatitis & encephalopathy
- B. Survival benefit has been reported for S-adenosyl methionine in alcoholic cirrhosis
- C. Diuretics, sedatives, aspirin, acetaminophen should be used with caution
- D. All of the above

Glucocorticoids in moderately large doses for 4 weeks is helpful in patients with severe alcoholic hepatitis and encephalopathy but have no role in the treatment of established alcoholic cirrhosis. S-adenosyl methionine decreases proinflammatory cytokines and has survival benefit in alcoholic cirrhosis. Diuretics, sedatives, aspirin, acetaminophen should be used with caution.

1139 Which of the following medications is approved for treating alcoholism by reducing craving ?

- A. Naltrexone

- B. Acamprosate
- C. Tiapride
- D. All of the above

Tiapride is a dopamine antagonist. Acamprosate helps restore balance of excitatory & inhibitory neurotransmission in nucleus accumbens by blocking GABA receptors and Glutamate receptors and activating GABA-A receptors. Naltrexone is an opioid antagonist.

1140 Which of the following terms are synonymous with posthepatic cirrhosis ?

Harrison's 17th Ed. 1973

- A. Coarsely nodular cirrhosis
- B. Multilobular cirrhosis
- C. Cryptogenic cirrhosis
- D. All of the above

Coarsely nodular cirrhosis and multilobular cirrhosis are terms synonymous with posthepatic cirrhosis. The term cryptogenic cirrhosis has been used interchangeably with posthepatic cirrhosis, but this designation should be reserved for those cases in which the etiology of cirrhosis is unknown (~10% of all patients with cirrhosis).

1141 Viral infections that can lead to chronic liver disease include all except ?

Harrison's 16th Ed. 1860t

- A. Cytomegalovirus
- B. Epstein-Barr virus
- C. Hepatitis C
- D. Hepatitis E

Viral infections that lead to chronic liver disease include hepatitis B, C, D, cytomegalovirus, EBV.

1142 Which of the following is a cause of chronic cholestatic syndrome ?

Harrison's 17th Ed. 1974

- A. Primary biliary cirrhosis (PBC)
- B. Autoimmune cholangitis
- C. Primary sclerosing cholangitis (PSC)
- D. All of the above

Causes of chronic cholestatic syndromes are primary biliary cirrhosis (PBC), autoimmune cholangitis, primary sclerosing cholangitis (PSC) and idiopathic adulthood ductopenia.

1143 Histopathologic features of chronic cholestasis are all except ?

Harrison's 17th Ed. 1974

- A. Copper deposition
- B. Xanthomatous transformation of hepatocytes
- C. Iron deposition
- D. Biliary fibrosis

Histopathologic features of chronic cholestasis are cholate stasis, copper deposition, xanthomatous transformation of hepatocytes, and biliary fibrosis. There may also be chronic portal inflammation, interface activity and chronic lobular inflammation. Ductopenia is a result of this progressive disease as patients develop cirrhosis.

1144 Steatosis is often present in patients with which HCV genotype ?

Harrison's 18th Ed. 2594

- A. 1
- B. 2
- C. 3
- D. 4

In patients with HCV genotype 3, steatosis is often present.

1145 Nonalcoholic steatohepatitis (NASH) is nowadays diagnosed as what was earlier diagnosed as ?

Harrison's 18th Ed. 2594

- A. Autoimmune cholangiopathy
- B. Cardiac cirrhosis
- C. Cryptogenic cirrhosis
- D. Autoimmune hepatitis

Many patients who were thought to have cryptogenic cirrhosis in fact have nonalcoholic steatohepatitis.

1146 Primary biliary cirrhosis (PBC) is characterized by ?

Harrison's 17th Ed. 1974

- A. Fibrous obliteration of intrahepatic bile ductules
- B. Fibrous obliteration of larger extrahepatic ducts
- C. Fibrous obliteration of intrahepatic bile ductules and larger extrahepatic ducts both
- D. None of the above

PBC is characterized by portal inflammation & necrosis of cholangiocytes in small and medium-sized bile ducts.

1147 In PBC, pruritus is most bothersome in ?

Harrison's 18th Ed. 2595

- A. Morning
- B. Afternoon
- C. Evening
- D. Night

In PBC, pruritus is most bothersome in the evening.

1148 Features unique to PBC include all except ?

Harrison's 18th Ed. 2595

- A. Hypopigmentation
- B. Xanthelasma
- C. Xanthomata
- D. Bone pain

Features unique to PBC include hyperpigmentation, xanthelasma, xanthomata & bone pain. The first three are related to the altered cholesterol metabolism seen in PBC.

1149 In PBC, hyperpigmentation is evident on ?

Harrison's 18th Ed. 2595

- A. Trunk
- B. Face
- C. Areas of exfoliation and lichenification
- D. All of the above

In PBC, hyperpigmentation is evident on trunk and arms and in areas of exfoliation and lichenification.

1150 Which of the following about primary biliary cirrhosis is false ?

N Engl J Med 2005;353:1261-73

- A. Most prevalent in northern Europe
- B. Slowly progressive autoimmune disease of liver
- C. Primarily affects men
- D. Peak incidence is in fifth decade of life

Among patients with symptomatic disease, 90% are women between age 35 to 60 years.

1151 Which of the following about primary biliary cirrhosis is true ?

N Engl J Med 2005;353:1261-73

- A. Antimitochondrial antibodies are present in ~90%
- B. Antimitochondrial antibodies are detectable years before clinical signs appear
- C. Autoantibodies recognize three to five inner mitochondrial membrane proteins
- D. All of the above

1152 Which of the following about primary biliary cirrhosis is true ?

N Engl J Med 2005;353:1261-73

- A. Fatigue & pruritus are the commonest presenting symptoms
- B. Pruritus precedes onset of jaundice by months to years
- C. Pruritus is usually worse at night and is exacerbated by contact with wool, other fabrics, or heat
- D. All of the above

In PBC, the earliest symptom is pruritus, which may be either generalized or limited initially to palms and soles. Fatigue is a prominent early symptom.

1153 Associated findings in primary biliary cirrhosis include all except ?

Harrison's 16th Ed. 1861

- A. Hyperlipidemia
- B. Autoimmune thyroid disease
- C. Osteomalacia
- D. Fibroadenoma breast

Protracted elevation of serum lipids, especially cholesterol, leads to subcutaneous lipid deposition around the eyes (xanthelasmas) and over joints and tendons (xanthomas). Clinical evidence of sicca syndrome is found in about 75%, and serologic evidence of autoimmune thyroid disease in 25% of patients. Osteomalacia occurs due to diminished vitamin D absorption. Accelerated osteoporosis is common.

1154 Coexisting autoimmune disease in primary biliary cirrhosis is ?

Harrison's 16th Ed. 1861

- A. Type I diabetes mellitus
- B. Scleroderma
- C. Pernicious anemia
- D. All of the above

1155 Coexisting autoimmune disease in primary biliary cirrhosis is ?

Harrison's 16th Ed. 1861

- A. Rheumatoid arthritis
- B. CREST syndrome
- C. Renal tubular acidosis
- D. All of the above

1156 Coexisting autoimmune disease in primary biliary cirrhosis is ?

Harrison's 16th Ed. 1861

- A. Keratoconjunctivitis sicca
- B. IgA deficiency
- C. CREST syndrome
- D. All of the above

PBC is frequently associated with a variety of autoimmune disorders, such as syndrome of calcinosis, Raynaud's phenomenon, esophageal dysmotility, sclerodactyly, telangiectasia (CREST); keratoconjunctivitis sicca syndrome (dry eyes and dry mouth); autoimmune thyroiditis; type 1 diabetes mellitus; IgA deficiency; rheumatoid arthritis, scleroderma, pernicious anemia, and renal tubular acidosis.

1157 Which of the following is true for “autoimmune cholangitis” ?*Harrison's 16th Ed. 1861*

- A. Histological features similar to PBC
- B. Negative AMA
- C. Antinuclear or smooth-muscle antibodies present
- D. All of the above

In autoimmune cholangitis, histological features are similar to PBC. The AMA titre is negative. Antinuclear or smooth-muscle antibodies are present.

1158 Antimitochondrial antibody (AMA) found in primary biliary cirrhosis is of which type of immunoglobulin ?*Harrison's 16th Ed. 1860*

- A. IgG
- B. IgM
- C. IgA
- D. IgE

A circulating IgG antimitochondrial antibody (AMA) is detected in ~90% of patients with PBC and only rarely in other forms of liver disease.

1159 Which of the following is an autoreactive mitochondrial antigen in primary biliary cirrhosis ?*Harrison's 16th Ed. 1860*

- A. Pyruvate dehydrogenase complex (PDC)
- B. 2-oxoglutarate dehydrogenase complex (OGDC)
- C. Branched-chain 2-oxoacid dehydrogenase complex
- D. All of the above

In PBC, circulating IgG antimitochondrial autoantibodies (AMA) recognize inner mitochondrial membrane proteins identified as enzymes of the pyruvate dehydrogenase complex (PDC), branched chain 2-oxoacid dehydrogenase complex (BCOADC), and 2-oxoglutarate dehydrogenase complex (OGDC).

1160 T cells infiltrating the liver in primary biliary cirrhosis are specific for ?*N Engl J Med 2005;353:1261-73*

- A. Pyruvate dehydrogenase E2 complex (PDC-E2)
- B. E3-binding protein (E3-BP)
- C. Ketoglutaric acid dehydrogenase E2 complex (OGDC-E2)
- D. Branched-chain 2-oxo-acid dehydrogenase E2 complex (BCKD-E2)

The major autoantigen in PBC (90%) is 74-kDa E2 component of PDC, dihydrolipoamide acetyltransferase. Antibodies are directed to a region essential for binding of a lipoic acid cofactor and inhibit the overall enzymatic activity of the PDC. Other AMA autoantibodies in PBC patients are directed to similar constituents of BCOADC and OGDC and also inhibit their enzymatic function.

1161 Hyperlipidemia seen in primary biliary cirrhosis shows a characteristic rise in ?*Harrison's 16th Ed. 1861*

- A. Serum unesterified cholesterol
- B. Serum triglycerides
- C. Serum LDLc
- D. Serum VLDLc

In PBC, hyperlipidemia is common with a striking increase of serum unesterified cholesterol.

1162 Asymptomatic patients of PBC are initially detected by ?*Harrison's 16th Ed. 1860*

- A. Elevated serum alkaline phosphatase levels
- B. Elevated AST levels
- C. Elevated ALT levels

- D. All of the above

Most patients with PBC are asymptomatic, and the disease is initially detected by elevated serum alkaline phosphatase levels during routine screening.

1163 Which of the following is false about ursodiol therapy in PBC ?*Harrison's 16th Ed. 1861*

- A. Dose is 13 to 15 mg/kg per day
- B. Should be given with food
- C. As a single dose daily
- D. None of the above

Ursodiol is given in doses of 13 to 15 mg/kg per day, with food and as a single dose daily.

1164 Drugs used to treat pruritus in primary biliary cirrhosis include all except ?*Harrison's 16th Ed. 1861*

- A. Cholestyramine
- B. Ondansetron
- C. Rifampin
- D. Tetracycline

Rifampin, opiate antagonists (naloxone or naltrexone), ondansetron, plasmapheresis, and ultraviolet light have been tried for control of pruritus with varying results. Cholestyramine, an oral bile salt sequestering resin, may be helpful in doses of 12 to 16 gm/day to decrease both pruritus and hypercholesterolemia.

1165 Which of the following drugs is not used in the treatment of primary biliary cirrhosis ?*Harrison's 16th Ed. 1861*

- A. Ursodeoxycholic acid
- B. Colchicine
- C. Methotrexate
- D. Imatinib mesylate

Glucocorticoids, colchicine, methotrexate, azathioprine, cyclosporine & tacrolimus are effective.

1166 The only established “cure” in the treatment of primary biliary cirrhosis is ?*Harrison's 16th Ed. 1861*

- A. Liver transplantation
- B. Long term Cyclosporine therapy
- C. Long term Tacrolimus therapy
- D. All of the above

Ursodiol therapy may not prevent ultimate progression of PBC and the only established ‘cure’ is liver transplantation.

1167 In PBC, when night blindness is refractory to vitamin A therapy, which element should be supplemented ?*Harrison's 16th Ed. 1861*

- A. Copper
- B. Zinc
- C. Cobalt
- D. Selenium

In PBC, fat-soluble vitamins A, D, E, and K should be given at regular intervals. Zinc supplementation may be necessary if night blindness is refractory to vitamin A therapy.

1168 Which of the following represent the pathological Stage I of PBC ?*Harrison's 16th Ed. 1861*

- A. Chronic nonsuppurative destructive cholangitis

- B. Reduction in number of bile ducts and proliferation of smaller bile ductules
- C. Decrease in interlobular ducts, loss of liver cells, and expansion of periportal fibrosis into a network of connective tissue scars
- D. Micronodular or macronodular cirrhosis

PBC is divided morphologically into 4 stages. Stage I is termed chronic nonsuppurative destructive cholangitis. It is a necrotizing inflammatory process of portal triads characterized by destruction of medium & small bile ducts, a dense infiltrate of acute & chronic inflammatory cells, mild fibrosis & occasionally, bile stasis. In stage II, inflammatory infiltrate becomes less prominent, number of bile ducts are reduced & smaller bile ductules proliferate. Over months to years there is a decrease in interlobular ducts, loss of liver cells & expansion of periportal fibrosis into a network of connective tissue scars marking stage III. Stage IV represents cirrhosis - micronodular or macronodular.

1169 Secondary biliary cirrhosis (SBC) is characterized by ?

Harrison's 16th Ed. 1860

- A. Fibrous obliteration of intrahepatic bile ductules
- B. Fibrous obliteration of larger extrahepatic ducts
- C. Fibrous obliteration of intrahepatic bile ductules and larger extrahepatic ducts both
- D. None of the above

Biliary cirrhosis results from injury to or prolonged obstruction of either the intrahepatic or extrahepatic biliary system. It is associated with impaired biliary excretion, destruction of hepatic parenchyma, and progressive fibrosis. Primary biliary cirrhosis (PBC) is characterized by chronic inflammation and fibrous obliteration of intrahepatic bile ductules. Secondary biliary cirrhosis (SBC) is the result of longstanding obstruction of the larger extrahepatic ducts.

1170 Prolonged cholestasis can lead to all of the following except ?

Harrison's 16th Ed. 1861

- A. Presence of Lipoprotein X
- B. Elevated liver copper levels
- C. Hypoprothrombinemia
- D. Serum aminotransferase > 300

An abnormal serum lipoprotein (lipoprotein X) and elevated liver copper levels may be present in PBC, though not specific. Deficiency of bile salts in intestine leads to moderate steatorrhea and impaired absorption of fat soluble vitamins and hypoprothrombinemia. Serum aminotransferase values rarely exceed 150 to 200 units.

1171 What duration of biliary obstruction is required to result in secondary biliary cirrhosis (SBC) ?

Harrison's 16th Ed. 1861

- A. At least 1 to 3 months
- B. At least 3 to 12 months
- C. At least 12 to 18 months
- D. At least 18 to 36 months

At least 3 to 12 months is required for biliary obstruction to result in finely nodular secondary biliary cirrhosis.

1172 In children, which of the following is a common cause of SBC ?

Harrison's 16th Ed. 1861

- A. Primary sclerosing cholangitis
- B. Gallstones
- C. Cystic fibrosis
- D. Chronic pancreatitis

1173 Which of the following rarely causes SBC ?

Harrison's 16th Ed. 1861

- A. Primary sclerosing cholangitis
- B. Malignant tumors of common bile duct or pancreas
- C. Chronic pancreatitis

D. Postoperative CBD strictures

In children, congenital biliary atresia & cystic fibrosis are common causes of SBC. In adults, biliary tract obstruction is mostly caused by postoperative strictures, gallstones, chronic pancreatitis or primary sclerosing cholangitis. Patients with malignant tumors of CBD or pancreas rarely survive long enough to develop SBC.

1174 Infections that can lead to chronic liver disease include all except ?

Harrison's 16th Ed. 1860t

- A. Brucellosis
- B. Toxoplasmosis
- C. Echinococcosis
- D. Leptospirosis

Infections that can lead to chronic liver disease include Brucellosis, Capillariasis, Echinococcosis, Schistosomiasis, Toxoplasmosis.

1175 Inherited & metabolic disorders that can lead to chronic liver disease include all except ?

Harrison's 16th Ed. 1860t

- A. α_1 -antitrypsin deficiency
- B. Fanconi's syndrome
- C. Wilson's disease
- D. Lyme's disease

1176 Inherited & metabolic disorders that can lead to chronic liver disease include all except ?

Harrison's 16th Ed. 1860t

- A. Galactosemia
- B. Gaucher's disease
- C. Hemochromatosis
- D. Renal tubular acidosis

Inherited and metabolic disorders that can lead to chronic liver disease include α_1 -Antitrypsin deficiency, Alagille's syndrome, Biliary atresia, Familial intrahepatic cholestasis (FIC) types 1-3, Fanconi's syndrome, Galactosemia, Gaucher's disease, Glycogen storage disease, Hemochromatosis, Hereditary fructose intolerance, Hereditary tyrosinemia, Wilson's disease.

1177 Drugs & toxins that can lead to chronic liver disease include all except ?

Harrison's 16th Ed. 1860t

- A. Oral contraceptives
- B. Amioradone
- C. Testosterone
- D. Arsenicals

Drugs & toxins that can lead to CLD include alcohol, amioradone, arsenicals, oral contraceptives (Budd-Chiari), pyrrolizidine alkaloids & antineoplastic agents.

1178 Disorders that can lead to chronic liver disease include all except ?

Harrison's 16th Ed. 1860t

- A. Biliary obstruction (chronic)
- B. Cystic fibrosis
- C. Wegener's granulomatosis
- D. Graft-versus-host disease

1179 Disorders that can lead to chronic liver disease include all except ?

Harrison's 16th Ed. 1860t

- A. Jejunoileal bypass

- B. Sarcoidosis
- C. Primary biliary cirrhosis
- D. Porphyrria

Disorders that can lead to chronic liver disease include Biliary obstruction (chronic), Cystic fibrosis, Graft-versus-host disease, Jejunoileal bypass, Nonalcoholic fatty liver disease, Primary biliary cirrhosis, Primary sclerosing cholangitis, Sarcoidosis.

1180 Which of the following about Primary Sclerosing Cholangitis (PSC) is false ?

Harrison's 18th Ed. 2596

- A. Chronic cholestatic syndrome
- B. Obliteration of intrahepatic biliary tree
- C. Obliteration of extrahepatic biliary tree
- D. None of the above

1181 Which of the following is seen frequently in Primary Sclerosing Cholangitis (PSC) ?

Harrison's 18th Ed. 2596

- A. Hodgekin's lymphoma
- B. Ulcerative colitis (UC)
- C. Azoospermia
- D. Amenorrhoea

Over 50% of patients with PSC also have ulcerative colitis (UC). Therefore, once a diagnosis of PSC is established, colonoscopy should be performed to look for evidence of UC.

1182 Pathologic change occurs in PSC is ?

Harrison's 18th Ed. 2596

- A. Bile duct proliferation
- B. Ductopenia
- C. Fibrous cholangitis (pericholangitis)
- D. All of the above

Pathologic changes that can occur in PSC show bile duct proliferation as well as ductopenia and fibrous cholangitis (pericholangitis).

1183 Which of the following antibody is seen frequently in Primary Sclerosing Cholangitis (PSC) ?

Harrison's 18th Ed. 2596

- A. Anti-DNA antibody
- B. Cryoglobulins
- C. Perinuclear antineutrophil cytoplasmic antibody (p-ANCA)
- D. Antiphospholipid antibody

Perinuclear antineutrophil cytoplasmic antibody (p-ANCA), is positive in ~65% of patients of PSC.

1184 Typical cholangiographic findings in PSC is ?

Harrison's 18th Ed. 2596

- A. Multiple calculi in biliary tree
- B. Multifocal stricturing & beading of biliary tree
- C. Diffuse fibrotic narrowing of biliary tree
- D. All of the above

Typical cholangiographic findings in PSC are multifocal stricturing and beading with intervening segments of normal or dilated ducts involving both the intrahepatic and extrahepatic biliary tree.

1185 Primary or idiopathic sclerosing cholangitis may be associated with ?

Harrison's 18th Ed. 2627

- A. Autoimmune pancreatitis

- B. Multifocal fibrosclerosis syndromes
- C. Riedel's struma
- D. All of the above

Primary or idiopathic sclerosing cholangitis may be associated with autoimmune pancreatitis; multifocal fibrosclerosis syndromes (retroperitoneal, mediastinal, and/or periureteral fibrosis), Riedel's struma or pseudotumor of the orbit.

1186 Which of the following has biochemical & cholangiographic features indistinguishable from PSC ?

Harrison's 18th Ed. 2627

- A. Immunoglobulin G1 - associated cholangitis
- B. Immunoglobulin G2 - associated cholangitis
- C. Immunoglobulin G3 - associated cholangitis
- D. Immunoglobulin G4 - associated cholangitis

Immunoglobulin G4-associated cholangitis is a recently described biliary disease of unknown etiology that presents with biochemical and cholangiographic features indistinguishable from PSC. Often associated with autoimmune pancreatitis & other fibrosing conditions but not inflammatory bowel disease, it is characterized by elevated serum IgG4 and infiltration of IgG4-positive plasma cells in bile ducts and liver tissue. Glucocorticoids and/or azathioprine are helpful.

1187 Independent predictor of a bad prognosis in PSC is ?

Harrison's 18th Ed. 2627

- A. Age
- B. Serum bilirubin concentration
- C. Liver histologic changes
- D. All of the above

Independent predictors of a bad prognosis in PSC are age, serum bilirubin concentration, liver histologic changes and splenomegaly. Cholangiocarcinoma is a dreaded consequence.

1188 Which of the following has cholangiographic appearance similar to that of PSC ?

Harrison's 18th Ed. 329, 2627

- A. AIDS cholangiopathy
- B. Traumatic biliary injury
- C. Chronic pancreatitis
- D. All of the above

AIDS cholangiopathy is a condition, usually due to infection of the bile duct epithelium with CMV or cryptosporidia, which has a cholangiographic appearance similar to that of PSC. These patients usually present with greatly elevated serum alkaline phosphatase levels (mean, 800 IU/L), but the bilirubin is often near normal. These patients do not typically present with jaundice.

1189 Which of the following is efficacious in PSC ?

Harrison's 18th Ed. 2627

- A. Glucocorticoids
- B. Methotrexate
- C. Cyclosporine
- D. UDCA

Glucocorticoids, methotrexate, and cyclosporine have not been shown to be efficacious in PSC. UDCA in high dosage (20 mg/kg) improves serum liver tests, but an effect on survival has not been documented.

1190 "Nutmeg liver" is the term used to describe liver in ?

Harrison's 18th Ed. 2596

- A. Cardiac cirrhosis
- B. Primary Biliary Cirrhosis
- C. Secondary Biliary Cirrhosis
- D. None of the above

In right heart failure, hepatic sinusoids become dilated & engorged with blood, along with hepatic ischemia from poor perfusion leading to necrosis of centrilobular hepatocytes with fibrosis in central areas. Centrilobular fibrosis extends outward in a characteristic stellate pattern from central vein.

1191 In "nutmeg liver", gross examination of liver shows which of the following ?

Harrison's 16th Ed. 1862

- A. Nodules on the surface of liver
- B. Alternating red and pale areas
- C. Pyramid like elevations on surface of liver
- D. Brownish black discolouration of liver

In nutmeg liver, gross examination shows alternating red (congested) & pale (fibrotic) areas.

1192 Which of the following is false in hepatomegaly due to prolonged right-sided heart failure ?

Harrison's 18th Ed. 2596

- A. Enlarged
- B. Firm
- C. Tender
- D. None of the above

With prolonged right heart failure, liver becomes enlarged, firm, & is usually nontender.

1193 Levels of which of the following is characteristically elevated in cardiac cirrhosis ?

Harrison's 18th Ed. 2596

- A. S. Bilirubin
- B. SGOT
- C. SGPT
- D. S. Alkaline phosphatase

ALP levels are characteristically elevated in cardiac cirrhosis, Aminotransferases may be normal or slightly increased with AST usually higher than ALT.

1194 Which of the following could lead to cardiac cirrhosis ?

Harrison's 16th Ed. 1862

- A. Valvular heart disease
- B. Constrictive pericarditis
- C. Cor pulmonale of long duration (>10 years)
- D. All of the above

The presence of a firm, enlarged liver with signs of chronic liver disease in a patient with valvular heart disease, constrictive pericarditis, or cor pulmonale of long duration (>10 years) should suggest cardiac cirrhosis.

1195 Inherited metabolic liver disease that can progress to cirrhosis is ?

Harrison's 18th Ed. 2597

- A. Hemochromatosis
- B. Wilson's disease
- C. Cystic fibrosis
- D. All of the above

Inherited metabolic liver diseases that can progress to cirrhosis include hemochromatosis, Wilson's disease, α_1 antitrypsin deficiency, and cystic fibrosis.

1196 Which of the following points against the diagnosis of Budd-Chiari syndrome ?

Harrison's 16th Ed. 1862

- A. Tender hepatomegaly

- B. Intractable ascites
- C. Right-sided heart failure
- D. Centrilobular congestion & sinusoidal dilatation on liver biopsy

In Budd-Chiari syndrome, liver is grossly enlarged, tender & severe intractable ascites is present. Signs & symptoms of heart failure are notably absent. Hepatic venography or liver biopsy showing centrilobular congestion & sinusoidal dilatation in absence of right heart failure characterize Budd-Chiari syndrome.

1197 Toxicity of which of the following vitamins can cause veno-occlusive disease of liver ?

Sherlock

- A. A
- B. D
- C. E
- D. K

1198 Acute Budd-Chiari syndrome has all the features except ?

Sherlock

- A. Abdominal pain
- B. Jaundice
- C. Ascites
- D. Caudate lobe hypertrophy

1199 Initial investigation of choice in suspected Budd-Chiari syndrome is ?

Sherlock

- A. USG abdomen
- B. Doppler studies
- C. CT abdomen
- D. MR angiography

1200 Portal hypertension is defined as elevation of hepatic venous pressure gradient to ?

Harrison's 18th Ed. 2597

- A. > 2 mm Hg
- B. > 3 mm Hg
- C. > 4 mm Hg
- D. > 5 mm Hg

Portal hypertension is defined as elevation of hepatic venous pressure gradient (HVPG) to >5 mmHg. Varices may develop but do not bleed if HVPG is <12 mm Hg. HVPG is equal to wedged hepatic venous pressure (portal venous pressure) minus free hepatic venous pressure (intra-abdominal pressure).

1201 In variceal hemorrhage, mortality associated with each episode of bleeding is ?

Harrison's 18th Ed. 2597

- A. 10 - 20 %
- B. 20 - 30 %
- C. 30 - 40 %
- D. 40 - 50 %

Mortality associated with each episode of variceal bleeding is 20 - 30 %. Even if the patient survives an initial episode of variceal bleeding, probability of another episode is high. Rebleeding rate without treatment is 70% within 1 year. The mortality rate with rebleeding is 33%.

1202 Portal vein is formed by the confluence of splenic vein with ?

Harrison's 18th Ed. 2597

- A. Superior mesenteric vein
- B. Inferior mesenteric vein

- C. Gastric vein
- D. All of the above

Portal vein is formed by the confluence of superior mesenteric and splenic veins.

1203 Normal pressure in the portal vein is ?

Harrison's 16th Ed. 1863

- A. 2 to 5 mm Hg
- B. 5 to 10 mm Hg
- C. 10 to 15 mm Hg
- D. 20 to 25 mm Hg

Normal pressure in portal vein is 5 to 10 mm Hg because of low vascular resistance in hepatic sinusoids.

1204 Esophageal varices are present in what percentage of compensated and decompensated cirrhosis ?

- A. 10 & 40 %
- B. 20 & 50 %
- C. 30 & 60 %
- D. 40 & 70 %

Esophageal varices are present in 30% of patients with compensated cirrhosis and in up to 60% of those with decompensated cirrhosis (with evidence of ascites or encephalopathy).

1205 Which of the following is a posthepatic cause of portal hypertension ?

Harrison's 18th Ed. 2598

- A. Portal vein thrombosis
- B. Budd-Chiari syndrome (BCS)
- C. Splenic vein thrombosis
- D. Venooclusive disease

1206 Which of the following is a posthepatic cause of portal hypertension ?

Harrison's 18th Ed. 2598

- A. Budd-Chiari syndrome (BCS)
- B. Venooclusive disease
- C. Chronic right-sided cardiac congestion
- D. All of the above

1207 Which of the following accounts for most cases of portal hypertension ?

Harrison's 18th Ed. 2598

- A. Prehepatic
- B. Intrahepatic
- C. Posthepatic
- D. Any of the above

Intrahepatic causes of portal hypertension account for over 95% of cases of portal hypertension and are represented by the major forms of cirrhosis.

1208 Budd-Chiari syndrome is an example of ?

Harrison's 18th Ed. 2598

- A. Pre sinusoidal obstruction
- B. Sinusoidal obstruction
- C. Post sinusoidal obstruction
- D. Any of the above

Postsinusoidal obstruction may also occur outside the liver at the level of the hepatic veins (Budd-Chiari syndrome), the inferior vena cava so that the liver parenchyma is exposed to elevated venous pressures.

1209 When cirrhosis is complicated by portal hypertension, the increased resistance is ?

Harrison's 18th Ed. 2598

- A. Pre sinusoidal
- B. Sinusoidal
- C. Post sinusoidal
- D. All of the above

Portal hypertension (>10 mm Hg) mostly results from increased resistance to portal blood flow. When hepatic cirrhosis is complicated by portal hypertension, increased resistance is usually sinusoidal.

1210 'Symmers' clay-pipe stem fibrosis in liver is due to ?

Harrison's 18th Ed. 1755

- A. Brucellosis
- B. Toxoplasmosis
- C. Echinococcosis
- D. Schistosomiasis

Intrahepatic presinusoidal causes of portal hypertension include congenital hepatic fibrosis and schistosomiasis. Schistosomiasis alone results in pure fibrotic lesions in liver. Cirrhosis occurs when other nutritional or infectious agents (hepatitis B or C virus) are involved. It is characteristically periportal (Symmers' clay pipe-stem fibrosis).

1211 Portal vein obstruction may occur in association with ?

Harrison's 18th Ed. 2598

- A. Cirrhosis
- B. Abdominal trauma
- C. Pancreatitis
- D. All of the above

Portal vein obstruction may be idiopathic or occur in association with cirrhosis, infection, pancreatitis, or abdominal trauma.

1212 Portal vein thrombosis may develop in ?

Harrison's 18th Ed. 2598

- A. Polycythemia vera
- B. Deficiencies of protein C, protein S, or antithrombin III
- C. Resistance to activated protein C (factor V Leiden)
- D. All of the above

Idiopathic portal vein thrombosis may develop in hypercoagulable states like polycythemia vera, essential thrombocythemia, deficiencies of protein C / protein S / antithrombin III, resistance to activated protein C (factor V Leiden) & mutation of prothrombin gene (G20210A).

1213 Primary complication of portal hypertension is ?

Harrison's 18th Ed. 2598

- A. Gastroesophageal varices with hemorrhage
- B. Ascites
- C. Hypersplenism
- D. All of the above

Three primary complications of portal hypertension are gastroesophageal varices with hemorrhage, ascites, and hypersplenism.

1214 On screening of histologically confirmed cirrhosis cases, what proportion of patients have esophageal varices ?

Harrison's 18th Ed. 2598

- A. One - fourth
- B. One - third
- C. One - half
- D. Three - fourth

On screening of histologically confirmed cirrhosis cases, one - third of patients have esophageal varices.

1215 In cirrhosis, factor predict the risk of esophageal variceal bleeding is ?*Harrison's 18th Ed. 2598*

- A. Severity of cirrhosis
- B. Wedged-hepatic vein pressure
- C. Tense ascites
- D. All of the above

In cirrhosis, factors that predict risk of esophageal variceal bleeding include severity of cirrhosis (Child's class, MELD score), height of wedged-hepatic vein pressure, size of varix, location of varix, endoscopic stigmata (red wale signs, hematocystic spots, diffuse erythema, bluish color, cherry red spots, or white-nipple spots) and tense ascites.

1216 Marker of the presence of cirrhosis in a patient being followed for chronic liver disease is ?*Harrison's 18th Ed. 2598*

- A. Progressive decrease in platelet count
- B. Progressive increase in platelet count
- C. Progressive decrease in lymphocyte count
- D. Progressive increase in lymphocyte count

Progressive decrease in platelet count serves as a marker of the presence of cirrhosis in a patient being followed for chronic liver disease. A low-normal platelet count can be the first clue to progression to cirrhosis.

1217 Marker of the presence of cirrhosis in a patient being followed for chronic liver disease is ?*Harrison's 18th Ed. 2598*

- A. Appearance of an enlarged spleen
- B. Development of ascites
- C. Hepatic encephalopathy
- D. All of the above

Progressive decrease in platelet count, appearance of enlarged spleen, development of ascites, encephalopathy, and/or esophageal varices with or without bleeding serve as markers of the presence of cirrhosis in a patient being followed for chronic liver disease.

1218 The risk of variceal hemorrhage is related to ?*Harrison's 18th Ed. 2598*

- A. Size of varices
- B. Appearance of varices
- C. Severity of liver dysfunction
- D. All of the above

Risk of variceal hemorrhage is related to size of varices (varices ≤ 5 mm in diameter have a 7% risk of bleeding in 2 years, while those > 5 mm have a 30% risk of bleeding within 2 years), appearance of the varices (red wale sign i.e. red streaks of mucosa overlying varix) have an increased risk of hemorrhage & severity of liver dysfunction (high Child-Pugh score - B or C represents decompensated cirrhosis & is associated with an increased risk of bleeding).

1219 In liver disease, development of portal hypertension is revealed by the appearance of which of the following ?*Harrison's 18th Ed. 2598*

- A. Splenomegaly
- B. Ascites
- C. Encephalopathy
- D. All of the above

In patients with liver disease, development of portal hypertension is revealed by the appearance of splenomegaly, ascites, encephalopathy, and/or esophageal varices.

1220 Which of the following statements about free and wedged hepatic vein pressure is false ?*Harrison's 18th Ed. 2598*

- A. Wedged hepatic vein pressure is usually normal in presinusoidal portal hypertension
- B. Wedged hepatic vein pressure is elevated in sinusoidal portal hypertension
- C. Wedged hepatic vein pressure is elevated in postsinusoidal portal hypertension
- D. None of the above

Wedged hepatic vein pressure is elevated in sinusoidal and postsinusoidal portal hypertension, it is normal in presinusoidal portal hypertension.

1221 What level of portal hypertension threatens bleeding from gastroesophageal varices ?*Harrison's 18th Ed. 2598*

- A. > 6 mm Hg
- B. > 8 mm Hg
- C. > 10 mm Hg
- D. > 12 mm Hg

Wedged and free hepatic vein pressures allow calculation of a wedged-to-free gradient, which is equivalent to the portal pressure. Average normal wedged-to-free gradient is 5 mmHg, and patients with a gradient > 12 mmHg are at risk for variceal hemorrhage.

1222 Apart from propranolol, which other β -adrenergic blocker is used to reduce portal pressure ?*Harrison's 18th Ed. 2598*

- A. Atenolol
- B. Nadolol
- C. Sotalol
- D. Carvedilol

β -adrenergic blockade with nonselective agents (propranolol or nadolol) reduces portal pressure through vasoconstrictive effects on both splanchnic arterial bed & portal venous system in combination with reduced cardiac output. Such therapy is effective in preventing both a first variceal bleed & subsequent episodes.

1223 Doses of propranolol to treat portal hypertension should aim to reduce the resting pulse rate by ?*Harrison's 16th Ed. 1863*

- A. 5 %
- B. 10 %
- C. 25 %
- D. 33 %

In treatment of portal hypertension, especially variceal bleeding, reduction of resting pulse through β -adrenergic blockade with nonselective agents such as propranolol by 25% is reasonable.

1224 The goal of treatment in patients of portal hypertension is to reduce hepatic venous pressure gradient (HVPG) to ?*Harrison's 16th Ed. 1864*

- A. < 20 mmHg or by 50% from baseline
- B. < 15 mmHg or by 40% from baseline
- C. < 12 mmHg or by 20% from baseline
- D. < 6 mmHg or by 10% from baseline

Treatment of patients with clinically significant sequelae of portal hypertension, especially variceal bleeding, is titrated to reduce the hepatic venous pressure gradient (HVPG = wedged hepatic venous pressure - free hepatic venous pressure) to < 12 mmHg or by 20% from baseline.

1225 "Caput medusae" is best related to ?*Harrison's 16th Ed. 1863*

- A. Cardioesophageal junction
- B. Rectum

- C. Retroperitoneal space
- D. Falciform ligament of liver

Major sites of portalsystemic collateral flow are veins around cardioesophageal junction (esophagogastric varices), rectum (hemorrhoids), retroperitoneal space & falciform ligament of liver (periumbilical or abdominal wall collaterals). Abdominal wall collaterals appear as tortuous epigastric vessels that radiate from umbilicus toward xiphoid & rib margins (caput medusae).

1226 Upper gastrointestinal tract is upto ?

Harrison's 17th Ed. 259, 1839

- A. Pylorus
- B. Ampulla of Vater
- C. Ligament of Treitz
- D. End of jejunum

Upper GI is above the ligament of Treitz. Over 90% of patients with melena are bleeding proximal to the ligament of Treitz, and about 90% of patients with hematochezia are bleeding from the colon.

1227 Most common cause of upper GI bleeding (UGIB) is ?

Harrison's 17th Ed. 257

- A. Esophageal varices
- B. Peptic ulcers
- C. Gastroduodenal erosions
- D. Erosive esophagitis

Peptic ulcers are the most common cause of UGIB, accounting for up to ~50% of cases.

1228 For melena, blood should be present in GI tract for what duration ?

Harrison's 17th Ed. 257

- A. 3 hours
- B. 7 hours
- C. 14 hours
- D. 22 hours

Melena indicates that blood has been present in the GI tract for at least 14 hours.

1229 Clues to upper gastrointestinal bleed include ?

Harrison's 17th Ed. 259

- A. Hyperactive bowel sounds
- B. Melena
- C. Elevated blood urea nitrogen
- D. All of the above

Clues to UGIB include melena, hyperactive bowel sounds & elevated BUN level (due to volume depletion and blood proteins absorbed in the small intestine).

1230 Which of the following is false about Dieulafoy's lesion ?

Harrison's 17th Ed. 1841

- A. Large-caliber arteriole beneath gastrointestinal mucosa
- B. Bleeds through a pinpoint mucosal erosion
- C. Most common on greater curvature of proximal stomach
- D. Also called persistent caliber artery

Dieulafoy's lesion is seen most commonly on the lesser curvature of the proximal stomach.

1231 Gastric antral vascular ectasia is the cause of ?

Harrison's 17th Ed. 259

- A. Washermen stomach
- B. Watermelon stomach
- C. Windmill stomach
- D. Windshield stomach

Watermelon stomach is seen in gastric antral vascular ectasia.

1232 Which of the following should be the first-line treatment to control bleeding acutely ?

Harrison's 18th Ed. 2598

- A. Somatostatin / octreotide
- B. Balloon tamponade
- C. Emergency portal-systemic nonselective shunts
- D. Endoscopic intervention

Endoscopic intervention should be the first-line treatment to control bleeding acutely. Treatment of acute bleeding requires both fluid and blood-product replacement as well as prevention of subsequent bleeding with Endoscopic variceal ligation (EVL).

1233 Sengstaken-Blakemore tube has how many lumens ?

Harrison's 16th Ed. 1864

- A. 1
- B. 2
- C. 3
- D. 4

1234 Minnesota tube has how many lumens ?

Harrison's 16th Ed. 1864

- A. 1
- B. 2
- C. 3
- D. 4

Balloon tamponade of bleeding gastroesophageal varices may be accomplished with a triple-lumen (Sengstaken-Blakemore) or four-lumen (Minnesota) tube with esophageal and gastric balloons.

1235 "TIPS" stands for ?

Harrison's 18th Ed. 2599

- A. Transcutaneous intrahepatic portosystemic shunt
- B. Transvenous intrahepatic portosystemic shunt
- C. Transjugular intrahepatic portosystemic shunt
- D. Transarterial intrahepatic portosystemic shunt

Decompression procedure to lower portal pressure is accomplished without surgery through percutaneous placement of a portal-systemic shunt, termed transjugular intrahepatic portosystemic shunt (TIPS).

1236 Hepatic encephalopathy occurs in what proportion of patients after TIPS ?

Harrison's 18th Ed. 2599

- A. 10 %
- B. 20 %
- C. 30 %
- D. 40 %

Hepatic encephalopathy occur in 20 % of patients after TIPS.

1237 Intravenous infusion of vasopressin results in ?

Harrison's 16th Ed. 1864

- A. Generalized vasoconstriction
- B. Vasoconstriction in portal venous system only
- C. Vasoconstriction in systemic venous system only
- D. None of the above

Intravenous infusion of vasopressin at a rate of 0.1 to 0.4 U/min results in "generalized vasoconstriction" leading to diminished blood flow in the portal venous system.

1238 Somatostatin and octreotide are ?*Harrison's 16th Ed. 1864*

- A. Generalized vasoconstrictors
- B. Direct splanchnic vasoconstrictors
- C. Direct systemic vasoconstrictors
- D. None of the above

*Somatostatin and its analogue, octreotide, are direct splanchnic vasoconstrictors.***1239 Serious side effects associated with vasopressin therapy are all except ?***Harrison's 16th Ed. 1864*

- A. Cardiac ischemia
- B. Gastrointestinal tract ischemia
- C. Acute renal failure
- D. Hyponatremia

*Serious side effects associated with vasopressin therapy include cardiac and gastrointestinal tract ischemia, acute renal failure, and hyponatremia.***1240 Concurrent use of which drug may enhance the effectiveness of vasopressin and reduce complications ?***Harrison's 16th Ed. 1864*

- A. Somatostatin
- B. Octreotide
- C. Nitroglycerin / isosorbide dinitrate
- D. All of the above

*Concurrent use of venodilators like IV nitroglycerin or isosorbide dinitrate sublingually may enhance the effectiveness of vasopressin and reduce complications.***1241 Which of the following agents is useful in the treatment of portal hypertensive gastropathy ?***Harrison's 18th Ed. 2599*

- A. Proton pump inhibitors
- B. H₂ receptor blockers
- C. Sucralfate
- D. None of the above

*Congestive gastropathy due to the venous hypertension is a complication of portal hypertension. Nonselective beta-adrenergic blockade is sometimes effective. Proton pump inhibitors or other agents useful in the treatment of peptic disease are usually not helpful.***1242 In absence of cirrhosis, splenomegaly with variceal hemorrhage suggests the possibility of ?***Harrison's 16th Ed. 1865*

- A. Splenic vein thrombosis
- B. Portal vein thrombosis
- C. Splenic hemorrhage
- D. Any of the above

*In the absence of cirrhosis, splenomegaly in association with variceal hemorrhage should suggest the possibility of splenic vein thrombosis.***1243 For isolated gastric varices due to splenic vein thrombosis, which of the following is curative ?***Harrison's 16th Ed. 1864*

- A. Beta adrenergic blockers
- B. TIPS
- C. Portal-systemic shunts
- D. Splenectomy

*For isolated gastric varices, splenic vein thrombosis should be specifically sought, since splenectomy is curative.***1244 Theories proposed for ascites include ?***Harrison's 16th Ed. 1865*

- A. "Underfilling" theory
- B. "Overflow" theory
- C. "Peripheral arterial vasodilation" theory
- D. All of the above

1245 Hepatic hydrothorax is more common on which side ?*Harrison's 18th Ed. 2600*

- A. Right side
- B. Left side
- C. Bilateral
- D. Any of the above

*Hepatic hydrothorax is more common on right side due to a rent in the diaphragm with free flow of ascitic fluid into the thoracic cavity.***1246 What does SAAG stand for ?***Harrison's 18th Ed. 2600*

- A. Serum ascites-to-albumin gradient
- B. Serum albumin-to-ascites gradient
- C. Serum albumin-to-anion gradient
- D. Serum anion-to-albumin gradient

*In cirrhosis, protein concentration of ascitic fluid is low (<1 g/dL). With the use of serum ascites-to-albumin gradient (SAAG), terms like exudative or transudative fluid have been replaced. Cirrhosis leading to portal hypertension leading to ascitis, gradient between serum albumin level and ascitic fluid albumin level is >1.1 g/dL. When the gradient is <1.1 g/dL, infectious or malignant causes of ascites should be considered.***1247 There is an increased risk for developing which of the following when levels of ascitic fluid proteins are very low ?***Harrison's 18th Ed. 2600*

- A. Refractory ascites
- B. Hepatic Encephalopathy
- C. Spontaneous Bacterial Peritonitis (SBP)
- D. Hepatocellular cancer

*When levels of ascitic fluid proteins are very low, patients are at increased risk for developing SBP.***1248 What absolute level of polymorphonuclear leukocytes count suggests ascitic fluid infection ?***Harrison's 18th Ed. 2600*

- A. > 100 / μ L
- B. > 150 / μ L
- C. > 200 / μ L
- D. > 250 / μ L

*A high level of red blood cells in the ascitic fluid signifies a traumatic tap or perhaps a hepatocellular cancer or a ruptured omental varix. When the absolute level of polymorphonuclear leukocytes is >250/ μ L, the question of ascitic fluid infection should be strongly considered.***1249 The recommended amount of sodium per day in the management of ascites is ?***Harrison's 18th Ed. 2600*

- A. < 2 gram
- B. < 4 gram
- C. < 6 gram

- D. < 8 gram

< 2 gram of sodium per day is the recommended amount in the management of ascites.

1250 Ascites may be demonstrated on physical examination when peritoneal fluid accumulation exceeds ?

Harrison's 16th Ed. 1866

- A. 200 ml
B. 500 ml
C. 1000 ml
D. 1500 ml

1251 Factors leading to worsening ascites include all except ?

Harrison's 16th Ed. 1866

- A. Excessive salt intake
B. Medication noncompliance
C. Superimposed infection
D. GI bleed

1252 Factors leading to worsening ascites include all except ?

Harrison's 16th Ed. 1866

- A. Worsening liver disease
B. Portal vein thrombosis
C. Splenic vein thrombosis
D. Development of hepatocellular carcinoma

1253 In cirrhosis liver with ascites, response to salt restriction alone is more likely to occur if ?

Harrison's 16th Ed. 1866

- A. Ascites is of recent onset
B. Underlying liver disease is reversible
C. Precipitating factor can be corrected
D. All of the above

1254 In cirrhosis liver with ascites, response to salt restriction alone is more likely to occur if ?

Harrison's 16th Ed. 1866

- A. High urinary sodium excretion (>25 mmol/day)
B. Normal renal function
C. Ascites is of recent onset
D. All of the above

1255 Which of the following statements about spontaneous bacterial peritonitis (SBP) is false ?

Harrison's 18th Ed. 2600

- A. Develops without obvious primary source of infection
B. Ascitic fluid has high concentrations of albumin
C. In ascitic fluid, >250 PMN/ μ L is diagnostic
D. Monomicrobial nonneutrocytic bacterascites is a variant of SBP

SBP is characterized by spontaneous infection of ascitic fluid in absence of intraabdominal source of infection. Bacterial translocation is the presumed mechanism for development of SBP, with gut flora traversing the intestine into mesenteric lymph nodes, leading to bacteremia and seeding of the ascitic fluid.

1256 Which of the following statements about spontaneous bacterial peritonitis (SBP) is false ?

Harrison's 18th Ed. 2601, N Engl J Med 2004;350:1646-54

- A. Escherichia coli are most commonly isolated

- B. A single organism is typically isolated
C. Anaerobes are found less frequently
D. Recurrent episodes are relatively uncommon

SBP involves translocation of bacteria from intestinal lumen to lymph nodes, with subsequent bacteremia & infection of ascitic fluid. After resolution, SBP frequently recurs, with an estimated 70% probability of recurrence at one year.

1257 Which of the following statements about spontaneous bacterial peritonitis (SBP) is false ?

Harrison's 18th Ed. 2601

- A. Therapy is for 10 to 14 days
B. Prophylactic norfloxacin reduces recurrences
C. Primary prevention recommended in high-risk cirrhotics
D. Empirical coverage for anaerobes is necessary

In patients with variceal hemorrhage, frequency of SBP is significantly increased, and prophylaxis against SBP is recommended when a patient presents with upper GI bleeding. Patients who have had an episode(s) of SBP and recovered, once-weekly administration of antibiotics is used as prophylaxis for recurrent SBP.

1258 Hepatorenal syndrome (HRS) occurs in what percentage of patients with advanced cirrhosis or acute liver failure ?

Harrison's 18th Ed. 2601

- A. ~ 5 %
B. ~ 10 %
C. ~ 20 %
D. ~ 30 %

HRS is a type of functional renal failure "without renal pathology" that occurs in ~10% of patients with advanced cirrhosis or acute liver failure.

1259 Which of the following about hepatorenal syndrome is false ?

Harrison's 18th Ed. 2601

- A. Splanchnic vasodilation
B. Arteriovenous shunting
C. Profound renal vasoconstriction
D. None of the above

In HRS, kidneys are structurally normal but fail due to splanchnic vasodilation & arteriovenous shunting, resulting in profound renal vasoconstriction resulting from extreme underfilling of arterial circulation.

1260 Renal failure in cirrhosis is defined as serum creatinine above ?

N Engl J Med 2009;361:1279-90

- A. 1.2 mg /dL
B. 1.3 mg /dL
C. 1.4 mg /dL
D. 1.5 mg /dL

Most studies & consensus conferences have defined renal failure in cirrhosis as a serum creatinine concentration above 1.5 mg /dL.

1261 Which of the following about hepatorenal syndrome is false ?

Harrison's 18th Ed. 2601

- A. Type I HRS is the more aggressive form
B. Type I HRS carries a mortality rate of >90%
C. HRS is seen in patients with refractory ascites
D. None of the above

HRS is a unique form of prerenal ARF that complicates advanced cirrhosis and acute liver failure and is seen in in patients with refractory ascites. Type I HRS is the more aggressive form of the disease & carries a mortality rate of >90%.

1262 Type 1 HRS is characterized by doubling of serum creatinine level to > 2.5 mg/dl in ?

N Engl J Med 2009;361:1279-90

- A. < 2 weeks
- B. < 4 weeks
- C. < 6 weeks
- D. < 8 weeks

Type 1 HRS is characterized by a doubling of serum creatinine level to > 2.5 mg/dl in < 2 weeks. Type 2 is characterized by a stable or less rapidly progressive course than in type 1.

1263 Which of the following is true for type 1 hepatorenal syndrome ?

N Engl J Med 2004;350:1646-54

- A. Progressive oliguria
- B. Rapid rise of serum creatinine
- C. Common precipitating event is SBP
- D. All of the above

type 1 hepatorenal syndrome is characterized by progressive oliguria and a rapid rise of the serum creatinine. A common precipitating event is spontaneous bacterial peritonitis (SBP).

1264 Which of the following is true for type 2 hepatorenal syndrome ?

N Engl J Med 2004;350:1646-54

- A. Most have refractory ascites
- B. Increase in serum creatinine is moderate
- C. No tendency of serum creatinine to progress over time
- D. All of the above

In type 2 hepatorenal syndrome, most patients have refractory ascites, increase in serum creatinine is moderate and has no tendency to progress over time.

1265 Type 2 HRS is mainly characterized by ?

N Engl J Med 2009;361:1279-90

- A. Hepatic encephalopathy
- B. Refractory ascites
- C. Hypotension
- D. All of the above

Type 1 hepatorenal syndrome has severe multiorgan dysfunction, which affects not only the kidneys but also the heart, systemic circulation, brain, adrenal glands, and liver, whereas the clinical course of patients with type 2 hepatorenal syndrome is mainly characterized by refractory ascites.

1266 Which of the following treatments have a role in hepatorenal syndrome ?

Harrison's 18th Ed. 2601

- A. Midodrine
- B. Octreotide
- C. Intravenous albumin
- D. All of the above

Currently, patients of HRS are treated with midodrine, an α -agonist, along with octreotide & IV albumin. The best therapy for HRS is liver transplantation.

1267 Which of the following is a vasoconstrictor drug ?

N Engl J Med 2009;361:1279-90

- A. Terlipressin
- B. Norepinephrine
- C. Midodrine
- D. All of the above

Best approach in management of HRS is administration of vasoconstrictor drugs. Treatment with renal vasodilators like dopamine or prostaglandins is ineffective.

1268 Long-term administration of which of the following reduces the risk of hepatorenal syndrome & improves survival ?

N Engl J Med 2009;361:1279-90

- A. Norfloxacin
- B. Eplerenone
- C. Toresamide
- D. Vitamin E

Long-term oral norfloxacin reduces risk of hepatorenal syndrome & improves survival.

1269 Which of the following statements about hepatorenal syndrome (HRS) is false ?

Harrison's 16th Ed. 1867

- A. Worsening azotemia
- B. Avid sodium retention
- C. Oliguria without identifiable causes of renal dysfunction
- D. Kidneys are structurally smaller

1270 Which of the following statements about hepatorenal syndrome (HRS) is false ?

Harrison's 16th Ed. 1867

- A. Urinalysis normal
- B. Renal biopsy is normal
- C. Kidneys can be used for renal transplantation
- D. Hypernatremia

1271 Which of the following statements about hepatorenal syndrome (HRS) is false ?

Harrison's 16th Ed. 1867

- A. Treatment is usually unsuccessful
- B. Vasodilator therapy with intravenous infusions of low dose dopamine is effective
- C. TIPS can improve renal function
- D. Treatment of choice is liver transplantation

1272 Which of the following is false about hepatic encephalopathy ?

Harrison's 18th Ed. 2601

- A. More common in chronic liver disease
- B. Essential for diagnosis of fulminant hepatic failure
- C. Diagnosis of hepatic encephalopathy is clinical
- D. None of the above

1273 Which of the following characteristics about hepatic encephalopathy is false ?

Harrison's 16th Ed. 1867

- A. Disturbances in consciousness
- B. Behavior & personality changes
- C. Fluctuating neurologic signs
- D. No electroencephalographic changes

1274 Which of the following statements about hepatic encephalopathy is false ?

Harrison's 18th Ed. 2601

- A. Blood-brain barrier is intact
- B. Ammonia is incriminated in its pathogenesis
- C. Many patients have elevated blood ammonia levels
- D. Mercaptans, short-chain fatty acids, & phenol are incriminated in its pathogenesis

1275 Which of the following statements about hepatic encephalopathy is false ?

Harrison's 16th Ed. 1867

- A. Reduced levels of consciousness is due to excessive concentrations of GABA in the CNS
- B. Endogenous benzodiazepines act through the GABA receptor
- C. 1,4-benzodiazepines is isolated from brain tissue of patients with fulminant hepatic failure
- D. Excessive magnesium deposition in basal ganglia contribute its pathogenesis

1276 Which of the following is the most common predisposing factor for hepatic encephalopathy ?

Harrison's 16th Ed. 1868

- A. Gastrointestinal bleeding
- B. Increased dietary protein
- C. Electrolyte disturbances
- D. Injudicious use of CNS-depressing drugs

1277 Which of the following is the most common predisposing factor for hepatic encephalopathy ?

Harrison's 16th Ed. 1868

- A. Gastrointestinal bleeding
- B. Surgery
- C. Superimposed acute viral hepatitis
- D. Alcoholic hepatitis

1278 Which of the following is the most common predisposing factor for hepatic encephalopathy ?

Harrison's 16th Ed. 1868

- A. Gastrointestinal bleeding
- B. Extrahepatic bile duct obstruction
- C. Constipation
- D. Surgery

1279 Neurologic signs in hepatic encephalopathy includes all except ?

Harrison's 16th Ed. 1868

- A. Rigidity
- B. Decreased DTR
- C. Extensor plantar signs
- D. Seizures

1280 Earliest sign of hepatic encephalopathy is ?

Harrison's 16th Ed. 1868

- A. EEG changes
- B. Asterixis
- C. Reversal of sleep / wake cycle
- D. Deterioration in handwriting

1281 Typical smell in fetor hepaticus is due to ?

Harrison's 16th Ed. 1868

- A. Mercaptans
- B. Ammonia
- C. Bilirubin
- D. All of the above

1282 Mercaptans are derived from intestinal metabolism of ?

Harrison's 16th Ed. 1867

- A. Threonine
- B. Methionine
- C. Leucine
- D. Isoleucine

1283 For diagnosis of hepatic encephalopathy, which of the following tests has most relevance ?

Harrison's 16th Ed. 1868

- A. Elevated serum ammonia level
- B. Examination of the cerebrospinal fluid
- C. Computed tomography of brain
- D. MRI of brain

1284 Disorders that can mimic the clinical features of hepatic encephalopathy are all except ?

Harrison's 16th Ed. 1868

- A. Acute alcohol intoxication
- B. Sedative overdose
- C. Delirium tremens
- D. Encephalitis

1285 Disorders that can mimic the clinical features of hepatic encephalopathy are all except ?

Harrison's 16th Ed. 1868

- A. Wernicke's encephalopathy
- B. Korsakoff's psychosis
- C. Subdural hematoma
- D. Schizophrenia

1286 Disorders that can mimic the clinical features of hepatic encephalopathy are all except ?

Harrison's 16th Ed. 1868

- A. Meningitis
- B. Hypoglycemia
- C. Hypocalcemia
- D. Wilson's disease

1287 Which of the following about lactulose is false ?

Harrison's 18th Ed. 2602

- A. Nonabsorbable
- B. Disaccharide
- C. Leads to colonic acidification
- D. None of the above

The mainstay of treatment for encephalopathy is lactulose. It is a nonabsorbable disaccharide, which results in colonic acidification. Consequent catharsis eliminates nitrogenous products in gut that are responsible for the development of encephalopathy.

1288 Goal of lactulose therapy is to promote how many soft stools per day ?

Harrison's 18th Ed. 2602

- A. 2 - 3
- B. 4 - 6
- C. 6 - 8
- D. 8 - 10

The goal of lactulose therapy is to promote 2 - 3 soft stools per day.

1289 Which of the following has a role in the treatment of hepatic encephalopathy ?*Harrison's 18th Ed. 2602*

- A. Azithromycin
- B. Ritonavir
- C. Rifaximin
- D. Lumefantrine

Rifaximin (550 mg twice daily) is very effective in treating encephalopathy without the known side effects of neomycin (renal insufficiency and ototoxicity) or metronidazole (peripheral neuropathy). Rifaximin is a poorly absorbed rifampin derivative & is highly effective against noninvasive bacterial pathogens (toxigenic & enteroaggregative *E. coli*).

1290 Supplementation of which of the following is recommended in patients with hepatic encephalopathy ?*Harrison's 18th Ed. 2602*

- A. Copper
- B. Zinc
- C. Calcium
- D. Magnesium

Zinc supplementation is at times helpful in patients with hepatic encephalopathy.

1291 First clotting factor to be depleted in cirrhosis liver is ?*Harrison's 16th Ed. 1869*

- A. Factor V
- B. Factor VII
- C. Factor VIII
- D. Factor IX

1292 In hepatic cirrhosis, which clotting factor is not reduced ?*Harrison's 16th Ed. 1869*

- A. Factor II
- B. Factor V
- C. Factor VII
- D. Factor XI

1293 Reduction in levels of which clotting factor is not worsened by the coincident malabsorption of vitamin K ?*Harrison's 18th Ed. 2602*

- A. Factor II
- B. Factor V
- C. Factor VII
- D. Factor XI

Vitamin K-dependent clotting factors are Factors II, VII, IX, and X. Because of a decrease in hepatic mass, administration of parenteral vitamin K does not improve clotting factors or prothrombin time.

1294 Coagulopathy in liver disease results due to ?*Harrison's 18th Ed. 2602*

- A. Decreased synthesis of clotting factors
- B. Impaired clearance of anticoagulants
- C. Thrombocytopenia due to hypersplenism
- D. All of the above

Coagulopathy is almost universal in patients with cirrhosis. There is decreased synthesis of clotting factors and impaired clearance of anticoagulants. Patients may have thrombocytopenia from hypersplenism due to portal hypertension.

1295 The triad of hepatopulmonary syndrome includes all except ?*Harrison's 18th Ed. 2524*

- A. Liver disease
- B. Hypoxemia
- C. Hypercarbia
- D. Pulmonary arteriovenous shunting

Patients with long-standing cirrhosis and portal hypertension are prone to develop the hepatopulmonary syndrome, defined by the triad of liver disease, hypoxemia, and pulmonary arteriovenous shunting. The defect in oxygenation is due to a ventilation-perfusion mismatch.

1296 Hepatopulmonary syndrome is manifested by ?*Harrison's 18th Ed. 2524, N Engl J Med 2008;358:2378-87*

- A. Hypoxemia
- B. Platypnea
- C. Orthodeoxia
- D. All of the above

Hepatopulmonary syndrome is characterized by platypnea and orthodeoxia, representing shortness of breath and oxygen desaturation that occur paradoxically upon assuming an upright position. If the partial pressure of oxygen in arterial blood decreases by 5% or more or by 4 mm Hg (0.5 kPa) or more when the patient moves from a supine to an upright position (called orthodeoxia), he or she may describe worsening dyspnea (platypnea) related to further ventilation-perfusion mismatch.

1297 Platypnea is a clinical presentation of ?*Harrison's 18th Ed. 279*

- A. Constrictive pericarditis
- B. Budd-Chiari Syndrome
- C. Left atrial myxoma
- D. HOCM

Platypnea (dyspnea in upright position with relief in supine position) is also a feature of left atrial myxoma.

1298 Which of the following is not a part of hepatopulmonary syndrome ?*N Engl J Med 2008;358:2378-87*

- A. Liver disease
- B. Pulmonary vascular dilatation
- C. Pulmonary vascular constriction
- D. Defect in oxygenation

Hepatopulmonary syndrome has three components - liver disease, pulmonary vascular dilatation, and a defect in oxygenation.

1299 The unique striking pathological feature of hepatopulmonary syndrome is ?*N Engl J Med 2008;358:2378-87*

- A. Gross dilatation of pulmonary pre- & capillary vessels
- B. Absolute increase in number of dilated vessels
- C. Pleural & pulmonary arteriovenous shunts
- D. All of the above

The unique striking pathological feature of hepatopulmonary syndrome is gross dilatation of pulmonary precapillary & capillary vessels (15 to 100 μ m diameter), coupled with an absolute increase in number of dilated vessels. Also, pleural and pulmonary arteriovenous shunts and portopulmonary venous anastomoses can be seen. In a healthy person, diameter of capillary ranges between 8 and 15 μ m.

1300 Which of the following has clinical similarities to hepatopulmonary syndrome ?*N Engl J Med 2008;358:2378-87*

- A. Blue rubber bleb syndrome
- B. Chiari malformation
- C. Dandy-Walker malformations

- D. Type 1 Abernethy malformation

Rare congenital cardiac disorders without liver injury in which either hepatic venous blood flow does not reach the lung or portal venous blood reaches the inferior vena cava without passing through the liver (Type 1 Abernethy malformation) have clinical similarities to hepatopulmonary syndrome. This provides support for the hypothesis that blood from the gut must cross liver to prevent pulmonary vascular dilatation.

Hepatocellular Carcinoma

1301 Which of the following statements is false ?

N Engl J Med 2011;365:1118-27

- A. Liver cancer is the fifth most common cancer in men and the seventh in women
- B. Highest incidence rates of liver cancer is in regions where infection with hepatitis B virus (HBV) is endemic
- C. Hepatocellular carcinoma rarely occurs before 40 years of age
- D. Hepatocellular carcinoma incidence reaches a peak at approximately 50 years of age

Hepatocellular carcinoma incidence reaches a peak at approximately 70 years of age. Rates of liver cancer among men are two to four times as high as the rates among women.

1302 Which of the following is associated with a reduced risk of hepatocellular carcinoma ?

N Engl J Med 2011;365:1118-27

- A. Coffee drinking
- B. Tea drinking
- C. Alcohol drinking
- D. Tobacco chewing

Studies conducted in Japan and southern Europe found that coffee drinking is associated with a reduced risk of hepatocellular carcinoma. Coffee drinking has also been associated with reduced insulin levels and a reduced risk of type 2 diabetes.

1303 Major risk factors for hepatocellular carcinoma (HCC) include infection with all except ?

N Engl J Med 2011;365:1118-27

- A. HBV
- B. HCV
- C. HIV
- D. Alcoholic liver disease

Major risk factors for HCC include infection with HBV or HCV, alcoholic liver disease & nonalcoholic fatty liver disease. Less common causes include hereditary hemochromatosis, alpha1-antitrypsin deficiency, autoimmune hepatitis, some porphyrias, and Wilson's disease.

1304 Aflatoxin B₁ is related to which of the following pathogen ?

Harrison's 18th Ed. 777

- A. Aspergillus
- B. Nocardia
- C. Candida
- D. Cryptococcus

Aflatoxin B₁ is a product of the *Aspergillus* fungus. It is a most potent ubiquitous natural chemical carcinogen producing signature mutations in p53 (mutation of arginine to serine at codon 249) and leads to hepatocellular carcinoma.

1305 Which of the following is a carcinogen ?

Harrison's 18th Ed. 777

- A. Pyrrolizidine alkaloids

- B. Tannic acid
- C. Safrole
- D. All of the above

1306 A typical interval between HCV-associated transfusion and subsequent HCC is approximately ?

Harrison's 18th Ed. 778

- A. 10 years
- B. 20 years
- C. 30 years
- D. 40 years

A typical interval between HCV-associated transfusion and subsequent HCC is approximately 30 years. HCV-associated HCC patients tend to have more frequent and advanced cirrhosis, but in HBV-associated HCC, only half the patients have cirrhosis; the remainder having chronic active hepatitis.

1307 Worldwide, chronic HBV infection accounts for what percentage of all cases of hepatocellular carcinoma ?

N Engl J Med 2011;365:1118-27

- A. ~ 25 %
- B. ~ 50 %
- C. ~ 75 %
- D. ~ 100 %

Worldwide, chronic HBV infection accounts for ~50% of all cases of hepatocellular carcinoma and virtually all childhood cases.

1308 What percentage of patients with HBV-related hepatocellular carcinoma have cirrhosis ?

N Engl J Med 2011;365:1118-27

- A. ~ 25 %
- B. ~ 50 %
- C. ~ 75 %
- D. ~ 100 %

HBV can cause hepatocellular carcinoma in the absence of cirrhosis. However, majority (70 to 80%) of patients with HBV-related hepatocellular carcinoma have cirrhosis.

1309 Factor associated with an increased risk of developing HCC is ?

Harrison's 18th Ed. 777

- A. Hepatitis B or C chronic infection
- B. Cirrhosis from any cause
- C. Nonalcoholic steatohepatitis (NASH)
- D. All of the above

Factor associated with an increased risk of developing HCC include hepatitis, alcohol, autoimmune chronic active hepatitis, cryptogenic cirrhosis and NASH/NAFL. Less common association is with primary biliary cirrhosis and several metabolic diseases including hemochromatosis, Wilson disease, alpha₁-antitrypsin deficiency, tyrosinemia, porphyria cutanea tarda, glycogenesis types 1 and 3, citrullinemia. and orotic aciduria.

1310 Which of the following is a paraneoplastic syndrome in HCC ?

Harrison's 18th Ed. 779

- A. Erythrocytosis
- B. Hypercalcemia
- C. Hypercholesterolemia
- D. All of the above

Most paraneoplastic syndromes in HCC are biochemical abnormalities without associated clinical consequences. They include hypoglycemia, erythrocytosis, hypercalcemia, hypercholesterolemia, dysfibrinogenemia, carcinoid syndrome, increased thyroxin-binding globulin, changes in secondary sex characteristics (gynecomastia, testicular atrophy & precocious puberty) & porphyria cutanea tarda.

1311 Which of the following estimations are useful in the surveillance for hepatocellular carcinoma ?

Harrison's 18th Ed. 779, N Engl J Med 2011;365:1118-27

- A Serum alpha-fetoprotein (AFP)
- B Des-gamma-carboxyprothrombin (DCP)
- C Lens culinaris agglutinin-reactive fraction of AFP (AFP-L3)
- D All of the above

Combined measurement of alpha-fetoprotein, with des-gamma-carboxyprothrombin or lectin-bound alpha-fetoprotein, provide limited additional benefit as compared with the measurement of alpha-fetoprotein alone.

1312 Which of the following is a protein induced by vitamin K absence ?

Harrison's 18th Ed. 779

- A PIVKA-1
- B PIVKA-2
- C PIVKA-3
- D PIVKA-4

PIVKA-2 is a protein induced by vitamin K absence. This protein is increased in as many as 80% of HCC patients but may also be elevated in patients with vitamin K deficiency. It is always elevated after Coumadin use. It may predict for portal vein invasion.

1313 Which of the following imaging modality is most recommended for hepatocellular carcinoma surveillance ?

Harrison's 18th Ed. 780, N Engl J Med 2011;365:1118-27

- A Ultrasonographic imaging
- B Computed tomography (CT)
- C Magnetic resonance imaging (MRI)
- D All of the above

CT and MRI are not generally recommended for hepatocellular carcinoma surveillance. Their sensitivity, specificity, and positive and negative predictive values for this purpose are unknown, and their use is associated with high cost as well as possible harm.

1314 Which of the following imaging feature is diagnostic of hepatocellular carcinoma ?

N Engl J Med 2011;365:1118-27

- A Focal hepatic mass >2 cm in diameter in cirrhotics
- B Areas of early arterial enhancement
- C Areas of delayed washout
- D All of the above

In patients with cirrhosis and a focal hepatic mass larger than 2 cm in diameter, areas of early arterial enhancement and delayed washout in venous or delayed phase of four-phase multidetector CT or in dynamic contrast-enhanced MRI have high predictive value for HCC.

1315 Which of the following is of no use in the diagnosis of HCC ?

Harrison's 18th Ed. 780

- A Triphasic CT
- B Gadolinium-enhanced MRI
- C Ultrasound
- D PET imaging

PET imaging was unsuccessful for the purpose.

1316 Child-Pugh scoring system uses how many clinical measures of liver disease ?

N Engl J Med 2011;365:1118-27

- A 3
- B 4

- C 5
- D 6

The Child-Pugh scoring system uses five clinical measures of liver disease.

1317 How many points in Child-Pugh scoring system denote class A disease ?

N Engl J Med 2011;365:1118-27

- A 5 or 6 points
- B 7 to 9 points
- C 10 to 15
- D 16 to 20 points

A sum of 5 or 6 points Child-Pugh scoring system indicate class A disease, 7 to 9 points class B, and 10 to 15 points class C, or the most severe disease.

1318 TACE stands for ?

N Engl J Med 2011;365:1118-27

- A Transarterial catheter embolization
- B Transarterial cryo embolization
- C Transarterial chemo embolization
- D Transarterial cavity embolization

Transarterial chemoembolization (TACE) is useful in intermediate-stage hepatocellular carcinoma. TACE improves survival among patients with preserved liver function, particularly those with Child-Pugh class A cirrhosis who do not have extrahepatic metastases, vascular invasion, or prominent cancer-related symptoms.

Chapter 310. Liver Transplantation

1319 Who pioneered liver transplantation ?

Harrison's 18th Ed. 2606

- A PW Angus
- B Thomas Starzl
- C JA Fishman
- D KF Murray

Pioneered in 1960s by Thomas Starzl at the University of Colorado and, later, at the University of Pittsburgh and by Roy Calne in Cambridge, England, liver transplantation is now performed routinely worldwide. Success measured as 1-year survival has improved from 30% in the 1970s to 90% today.

1320 Arteriohepatic dysplasia, with paucity of bile ducts, and congenital malformations, including pulmonary stenosis is called ?

Harrison's 18th Ed. 2607, Table 310-1

- A Alagille's syndrome
- B Byler's disease
- C Caroli's disease
- D Budd-Chiari syndrome

1321 Intrahepatic cholestasis, progressive liver failure, mental and growth retardation is called ?

Harrison's 18th Ed. 2607, Table 310-1

- A Alagille's syndrome
- B Byler's disease
- C Caroli's disease
- D Budd-Chiari syndrome

1322 Multiple cystic dilatations of the intrahepatic biliary tree is called ?

Harrison's 18th Ed. 2607, Table 310-1

- A. Alagille's syndrome
- B. Byler's disease
- C. Caroli's disease
- D. Budd-Chiari syndrome

1323 The most common indication for transplantation in children is ?

Harrison's 18th Ed. 2607

- A. Congenital hepatic fibrosis
- B. Biliary atresia
- C. Crigler-Najjar disease type I
- D. Neonatal hepatitis

The most common indication for transplantation in children is biliary atresia.

1324 Currently, which of the following is the most common indications for liver transplantation in adults ?

Harrison's 18th Ed. 2607

- A. Fulminant hepatitis
- B. Primary sclerosing cholangitis
- C. Chronic hepatitis C
- D. Primary biliary cirrhosis

Currently, chronic hepatitis C & alcoholic liver disease are the most common indications for liver transplantation, accounting for over 40% of all adult candidates who undergo the procedure.

1325 Which of the following is not an absolute contraindication for liver transplantation ?

Harrison's 18th Ed. 2608

- A. Advanced age (>70 years)
- B. Metastatic malignancy
- C. Active drug abuse
- D. Active alcohol abuse

Absolute contraindications for transplantation include life-threatening systemic diseases, uncontrolled extrahepatic bacterial or fungal infections, preexisting advanced cardiovascular or pulmonary disease, multiple uncorrectable life-threatening congenital anomalies, metastatic malignancy, and active drug or alcohol abuse. Advanced age (>70 years) should be considered a relative contraindication.

1326 Cadaver donor livers for liver transplantation are procured primarily from victims of ?

Harrison's 18th Ed. 2608

- A. Head trauma
- B. Jail deaths
- C. Suicide deaths
- D. Voluntary donors

Cadaver donor livers for transplantation are procured primarily from victims of head trauma.

1327 Which of the following about cadaver donor livers for liver transplantation is false ?

Harrison's 18th Ed. 2608

- A. Compatibility in ABO blood group is essential
- B. Human leukocyte antigen (HLA) matching is not required
- C. University of Wisconsin (UW) solution used for preservation
- D. None of the above

1328 UNOS stands for ?

Harrison's 18th Ed. 2609

- A. United Network for Organ Selection
- B. United Network for Organ Sharing
- C. United Network for Organ Surgery
- D. United Network for Organ Substitution

UNOS stands for United Network for Organ Sharing. It was adopted in 2002.

1329 Liver recipients with what MELD scores experienced higher posttransplantation mortality rates ?

Harrison's 18th Ed. 2609

- A. < 15
- B. < 20
- C. < 25
- D. < 30

Liver recipients with MELD scores <15 experienced higher posttransplantation mortality rates. The MELD scale is continuous, with 34 levels ranging between 6 and 40. Donor organs usually do not become available unless the MELD score exceeds 20.

1330 Which immunosuppressive agent can be given after liver transplantation ?

Harrison's 18th Ed. 2610

- A. Cyclosporine
- B. Tacrolimus
- C. Mycophenolic acid
- D. All of the above

1331 Which of the following is true about Cyclosporine ?

Harrison's 18th Ed. 2610

- A. Isolated from *Streptomyces tsukubaensis*
- B. Calcineurin inhibitor (CNI)
- C. Nonnucleoside purine metabolism inhibitor
- D. Monoclonal antibodies to T cells

Cyclosporine is a calcineurin inhibitor (CNI). It blocks early activation of T cells & is specific for T cell functions that result from the interaction of T cell with its receptor and that involve the calcium-dependent signal transduction pathway. Activity of cyclosporine leads to inhibition of lymphokine gene activation, blocking interleukins 2, 3, and 4, tumor necrosis factor α , and other lymphokines. Cyclosporine also inhibits B cell functions. This process occurs without affecting rapidly dividing cells in the bone marrow, thus reducing frequency of posttransplantation systemic infections.

1332 Which of the following is a macrolide lactone antibiotic ?

Harrison's 18th Ed. 2610

- A. Cyclosporine
- B. Tacrolimus
- C. Mycophenolic acid
- D. Rapamycin

*Tacrolimus is a macrolide lactone antibiotic isolated from a Japanese soil fungus, *Streptomyces tsukubaensis*.*

1333 Which of the following side effects are not present with use of Tacrolimus, but present with use of Cyclosporine ?

Harrison's 18th Ed. 2610

- A. Nephrotoxicity
- B. Hypertension
- C. Hirsutism
- D. Diabetes mellitus

Tacrolimus does not cause hirsutism or gingival hyperplasia.

1334 Which of the following is a nonnucleoside purine metabolism inhibitor ?

Harrison's 18th Ed. 2610

- A. Cyclosporine
- B. Tacrolimus
- C. Mycophenolic acid
- D. Rapamycin

*Mycophenolic acid, a nonnucleoside purine metabolism inhibitor derived as a fermentation product from several *Penicillium* species.*

1335 Hemolytic uremic syndrome can be associated with ?

Harrison's 18th Ed. 2611

- A. Cyclosporine
- B. Tacrolimus
- C. OKT3
- D. All of the above

Hemolytic uremic syndrome can be associated with cyclosporine, tacrolimus, or OKT3.

Chapter 312. Approach to the Patient with Pancreatic Disease

1336 How much of pancreas must be damaged before maldigestion of fat and protein is manifested ?

Harrison's 18th Ed. 2629

- A. ~ 25 %
- B. ~ 50 %
- C. ~ 75 %
- D. ~ 90 %

> 90% of pancreas must be damaged before maldigestion of fat & protein is manifested.

1337 Patients with proven pancreatitis have spuriously low levels of amylase in ?

Harrison's 18th Ed. 2631

- A. Incomplete ductal obstruction
- B. Pseudocyst formation
- C. Hypertriglyceridemia
- D. All of the above

Serum amylase level may be normal if hypertriglyceridemia is present.

1338 In acute pancreatitis, serum amylase rises within ?

Harrison's 18th Ed. 2631

- A. 24 hours
- B. 36 hours
- C. 48 hours
- D. 72 hours

1339 In acute pancreatitis, serum amylase remains elevated for ?

Harrison's 18th Ed. 2631

- A. 1 - 3 days
- B. 3 - 7 days
- C. 7 - 9 days
- D. 9 - 14 days

In acute pancreatitis, the serum amylase is usually elevated within 24 hours of onset and remains

so for 3 - 7 days. Levels usually return to normal within 7 days unless there is pancreatic ductal disruption, ductal obstruction, or pseudocyst formation.

1340 Hyperamylasemia is found in ?

Harrison's 18th Ed. 2632, Table 312-2

- A. Acute Pancreatitis
- B. Diabetic ketoacidosis
- C. Perforated peptic ulcer
- D. All of the above

1341 Hyperamylasemia is found in which of the following ?

Harrison's 18th Ed. 2632, Table 312-2

- A. Carcinoma of lung
- B. Carcinoma of esophagus
- C. Breast carcinoma
- D. All of the above

"Tumor" hyperamylasemia is seen in Carcinoma of lung, Carcinoma of esophagus, Breast carcinoma and ovarian carcinoma.

1342 Hyperamylasemia is found in which of the following ?

Harrison's 18th Ed. 2632, Table 312-2

- A. Pregnancy
- B. Aortic aneurysm
- C. Morphine
- D. All of the above

1343 The newer lipase assays relate best to which of the following ?

Harrison's 18th Ed. 2632

- A. Trypsin
- B. Chymotrypsin
- C. Colipase
- D. Phospholipase A₂

Lipase is the single best enzyme to measure for diagnosis of acute pancreatitis. The newer lipase assays have colipase as a cofactor and are fully automated.

1344 Which of the following blood test is reliable for diagnosis of acute pancreatitis in patients with renal failure ?

Harrison's 18th Ed. 2632

- A. Serum amylase
- B. Serum lipase
- C. Serum trypsinogen
- D. None of the above

No single blood test is reliable for the diagnosis of acute pancreatitis in patients with renal failure. Trypsinogen, amylase & lipase are excreted by kidney therefore are elevated in renal failure.

1345 Serum amylase levels are elevated when creatinine clearance is less than ?

Harrison's 18th Ed. 2632

- A. < 100 mL / minute
- B. < 85 mL / minute
- C. < 75 mL / minute
- D. < 50 mL / minute

Serum amylase levels are elevated in patients with renal dysfunction when creatinine clearance is < 50 mL/minute.

1346 In acute pancreatitis, serum amylase values are highly specific if they are more than ?

Harrison's 18th Ed. 2632

- A. Two times normal
- B. Three times normal
- C. Four times normal
- D. Five times normal

In acute pancreatitis, serum amylase values > 3 times normal are highly specific.

1347 How much exocrine function of pancreas must be lost before secretin stimulation test is abnormal ?

Harrison's 17th Ed. 2002

- A. ~ 15 %
- B. ~ 20 %
- C. ~ 40 %
- D. ~ 60 %

Secretin stimulation test for assessing pancreatic exocrine function is abnormal when >60% of exocrine function has been lost.

1348 Enzyme trypsinogen is present in which of the following ?

Harrison's 17th Ed. 2002

- A. Gall bladder
- B. Pancreas
- C. Intestine
- D. All of the above

Pancreas is the only organ that contains trypsinogen.

1349 Normal serum trypsinogen level is ?

Harrison's 17th Ed. 2005

- A. 18 - 28 ng/mL
- B. 28 - 58 ng/mL
- C. 60 - 98 ng/mL
- D. 100 - 158 ng/mL

The normal values of serum trypsinogen are 28 - 58 ng/mL.

1350 "Sentinel loop" refers to a localized ileus of which part of intestine in acute pancreatitis ?

Harrison's 17th Ed. 2002

- A. Duodenum
- B. Jejunum
- C. Ileum
- D. Colon

"Sentinel loop" refers to a localized ileus of jejunum in acute pancreatitis.

1351 "Colon cutoff sign" refers to isolated distention of which part of intestine in acute pancreatitis ?

Harrison's 17th Ed. 2002

- A. Ascending colon
- B. Transverse colon
- C. Descending colon
- D. Sigmoid colon

"Colon cutoff sign" refers to isolated distention of transverse colon in acute pancreatitis.

1352 In chronic pancreatitis, pancreatic calcification on radiological examination is superimposed on which lumbar vertebra ?

Harrison's 17th Ed. 2002

- A. I
- B. II
- C. III
- D. IV

In chronic pancreatitis, radiographic pancreatic calcification is superimposed on 2nd lumbar vertebra.

313 - Acute and Chronic Pancreatitis

1353 The quantity of pancreatic secretion per day is ?

Harrison's 18th Ed. 2634

- A. 1000 - 1500 ml
- B. 1500 - 3000 ml
- C. 3000 - 4500 ml
- D. About 5000 ml

1354 The pancreatic secretion contain about ?

Harrison's 18th Ed. 2634

- A. 10 enzymes and zymogens
- B. 20 enzymes and zymogens
- C. 30 enzymes and zymogens
- D. 40 enzymes and zymogens

1355 The pancreatic secretion is ?

Harrison's 18th Ed. 2634

- A. Isosmotic alkaline
- B. Isosmotic acidic
- C. Hyposmotic alkaline
- D. Hyposmotic acidic

Pancreas secretes 1500 - 3000 mL of isosmotic alkaline (pH > 8.0) fluid / day containing ~20 enzymes & zymogens.

1356 Which of the following about secretin is false ?

Harrison's 18th Ed. 2634

- A. Gastric acid is a stimulus for release of secretin
- B. Secretin is a peptide with 27 amino acids
- C. pH threshold for release of secretin from duodenum & jejunum is 6.5
- D. Secretin stimulates secretion of pancreatic juice rich in water & electrolytes

1357 Which of the following about cholecystokinin (CCK) is false ?

Harrison's 18th Ed. 2634

- A. CCK evokes an enzyme-rich secretion from pancreas
- B. Release of CCK is triggered by short-chain fatty acids
- C. Release of CCK is triggered by essential amino acids
- D. Release of CCK is triggered by gastric acid

Release of CCK from duodenum & jejunum is triggered by long-chain fatty acids, essential amino acids (tryptophan, phenylalanine, valine, methionine), and gastric acid itself.

1358 Which of the following statements is false ?

Harrison's 18th Ed. 2634

- A. Bile salts stimulate pancreatic secretion

- B. Parasympathetic nervous system exerts significant control over pancreatic secretion
- C. Vasoactive intestinal peptide (VIP) is a CCK agonist
- D. H_2O and HCO_3^- secretion by pancreas is dependent secretin and CCK

Vagal stimulation leads to release of VIP which is a secretin agonist.

1359 The quantity of bicarbonate from pancreas needed to neutralize gastric acid is ?

Harrison's 16th Ed. 1895

- A. 20 to 30 mmol/day
- B. 50 to 100 mmol/day
- C. 120 to 300 mmol/day
- D. About 500 mmol/day

1360 In acini and in ducts, which hormone causes the cells to add water and bicarbonate to pancreatic fluid ?

Harrison's 18th Ed. 2634

- A. Insulin
- B. Secretin
- C. Somatostatin
- D. Gastrin

Gastric acid is the stimulus for release of secretin which stimulates secretion of pancreatic juice rich in water and electrolytes. CCK evokes an enzyme-rich secretion from the pancreas.

1361 Pancreatic exocrine secretion is influenced by ?

Harrison's 18th Ed. 2634

- A. Somatostatin
- B. Neuropeptide Y
- C. Calcitonin gene - related peptides
- D. All of the above

Pancreatic exocrine secretion is influenced by inhibitory neuropeptides like somatostatin, pancreatic polypeptide, peptide YY, neuropeptide Y, enkephalin, pancreastatin, calcitonin gene-related peptides, glucagon, and galanin.

1362 Which of the following correlates best between stimulation with secretin and the pancreatic mass ?

Harrison's 18th Ed. 2634

- A. Maximal sodium output
- B. Maximal chloride output
- C. Maximal acid output
- D. Maximal bicarbonate output

1363 Bicarbonate in pancreatic secretion is related to ?

Harrison's 18th Ed. 2634

- A. Insulin
- B. Glucagon
- C. Cystic fibrosis transmembrane conductance regulator
- D. All of the above

In pancreatic ductal cells, cystic fibrosis transmembrane conductance regulator (CFTR) controls chloride and bicarbonate fluxes.

1364 Pancreas secretes which of the following enzymes ?

Harrison's 18th Ed. 2634

- A. Amylolytic
- B. Lipolytic

- C. Proteolytic
- D. All of the above

The pancreas secretes amylolytic, lipolytic, and proteolytic enzymes.

1365 The lipolytic enzymes secreted by pancreas are ?

Harrison's 18th Ed. 2634

- A. Lipase
- B. Phospholipase A
- C. Cholesterol esterase
- D. All of the above

Lipolytic enzymes secreted by pancreas include lipase, phospholipase A & cholesterol esterase.

1366 Which of the following about bile salts is false ?

Harrison's 18th Ed. 2634

- A. Inhibit lipase in isolation
- B. Colipase binds to lipase & prevents inhibition by bile salts
- C. Activate phospholipase A and cholesterol esterase
- D. None of the above

Bile salts inhibit lipase in isolation, but colipase of pancreatic secretion, binds to lipase and prevents this inhibition. Bile salts activate phospholipase A and cholesterol esterase.

1367 Which of the following statements is false ?

Harrison's 18th Ed. 2634

- A. Bile salts inhibit lipase
- B. Colipase binds to lipase
- C. Bile salts activate phospholipase A & cholesterol esterase
- D. None of the above

Bile salts inhibit lipase. Colipase in pancreatic secretion binds to lipase and prevents this inhibition. Bile salts activate phospholipase A and cholesterol esterase.

1368 Proteolytic enzymes secreted as inactive precursors are called ?

Harrison's 18th Ed. 2634

- A. Zymogens
- B. Proteogens
- C. Amylogens
- D. Chymogens

Proteolytic enzymes are secreted as inactive precursors called zymogens.

1369 Enzyme that cleaves lysine-isoleucine bond of trypsinogen to form trypsin is ?

Harrison's 18th Ed. 2634

- A. Duodenokinase
- B. Enterokinase
- C. Gastrokinae
- D. Trypsokinase

1370 Bond that is cleaved to form trypsin from trypsinogen is ?

Harrison's 18th Ed. 2634

- A. Lysine-isoleucine bond
- B. Arginine-Threonine bond
- C. Arginine-Lysine bond
- D. Threonine-Lysine bond

1371 Enzyme enterokinase is found in ?

Harrison's 18th Ed. 2634

- A. Gastric mucosa
- B. Duodenal mucosa
- C. Jejunal mucosa
- D. Ileal mucosa

Enterokinase is an enzyme found in duodenal mucosa. It cleaves lysine-isoleucine bond of trypsinogen to form trypsin.

1372 Which of the following can lyse and inactivate trypsin ?

Harrison's 18th Ed. 2634

- A. Mesotrypsin
- B. Chymotrypsin c
- C. Enzyme y
- D. All of the above

Mesotrypsin, chymotrypsin c, and enzyme y can also lyse and inactivate trypsin.

1373 Protease inhibitors are found in ?

Harrison's 18th Ed. 2634

- A. Pancreatic acinar cells
- B. Pancreatic secretions
- C. Alpha₁- and alpha₂-globulin fractions of plasma
- D. All of the above

Protease inhibitors, that prevent autodigestion of pancreas, are found in the acinar cells, the pancreatic secretions, and the alpha₁- and alpha₂-globulin fractions of plasma.

1374 Kazal type 1 (SPINK1) is best related to ?

Harrison's 17th Ed. 2006

- A. Pancreatic hyperstimulation
- B. Alcohol abuse
- C. Anti-inflammatory cytokine
- D. Serine protease inhibitor

Autodigestion of the pancreas is prevented by the packaging of proteases in precursor form and by the synthesis of protease inhibitors, i.e., pancreatic secretory trypsin inhibitor (PSTI) and serine protease inhibitor, kazal type 1 (SPINK1) that prevents conversion of trypsinogen to trypsin.

1375 SPINK1 is synthesised in ?

Lancet 2008;371:143-52

- A. Gall bladder
- B. Duodenum
- C. Stomach
- D. Pancreas

Pancreas synthesises SPINK1, a specific trypsin inhibitor, the function of which can be lost by mutation. In pancreatic ductal cells, CFTR controls chloride and bicarbonate fluxes. SPINK1 and CFTR mutations together may cause pancreatitis.

1376 Which of the following is not a type of trypsinogen in human pancreatic juice ?

Gastroenterology 2007;132:1557-1573

- A. Telotrypsinogen
- B. Cationic trypsinogen
- C. Anionic trypsinogen
- D. Mesotrypsinogen

Three different trypsinogens in human pancreatic juice have been designated according to their electrophoretic mobility, as cationic trypsinogen (PRSS1), anionic trypsinogen (PRSS2) & mesotrypsinogen (PRSS3). Compared with the anionic isoenzyme, cationic trypsinogen autoactivates more easily and is more resistant to autolysis.

1377 Which of the following is the most common PRSS1 mutation ?

Gastroenterology 2007;132:1557-1573

- A. R122A
- B. R122C
- C. R122H
- D. R122K

R122H is the most common PRSS1 mutation observed worldwide. Mutations in PRSS1 gene are seen in most patients with hereditary pancreatitis.

1378 CFTR and SPINK1 genetic mutations causing acute pancreatitis are frequent in ?

Lancet 2008;371:143-52

- A. Thalassemia patients
- B. HIV-positive patients
- C. COPD patients
- D. Leukemia patients

Genetic mutations such as those in CFTR and SPINK1 genes are frequent in HIV-positive patients with acute pancreatitis.

1379 CCK-releasing factor (CCK-RF) is present in ?

Harrison's 18th Ed. 2635

- A. Stomach
- B. Duodenum
- C. Jejunum
- D. All of the above

Duodenum contains a peptide CCK-releasing factor that is involved in stimulating CCK release.

1380 Which of the following is the most common cause of acute pancreatitis ?

Harrison's 18th Ed. 2635

- A. Gallstones
- B. Alcohol
- C. Drugs
- D. ERCP

Cause of acute pancreatitis include gallstones (30-60%), alcohol (15-30%), hypertriglyceridemia (1.3-3.8%), ERCP (5-20%) and drug-related (2-5%).

1381 Risk factors for post-ERCP pancreatitis include ?

Harrison's 18th Ed. 2635

- A. Sphincter of Oddi dysfunction
- B. Age < 60 years
- C. > 2 contrast injections into pancreatic duct
- D. All of the above

Risk factors for post-ERCP pancreatitis include minor papilla sphincterotomy, sphincter of Oddi dysfunction, prior history of post-ERCP pancreatitis, age <60 years, >2 contrast injections into the pancreatic duct, and endoscopic trainee involvement.

1382 What level of hypertriglyceridemia causes acute pancreatitis ?

Harrison's 18th Ed. 2635

- A. > 250 mg / dL
- B. > 500 mg / dL
- C. > 750 mg / dL
- D. > 1000 mg / dL

Hypertriglyceridemia can cause acute pancreatitis in 1.3 - 3.8% of cases when serum triglyceride levels are usually > 1000 mg/dL. The goal is to reduce fasting plasma triglycerides to below 500 mg/dL to prevent the risk of acute pancreatitis.

1383 Which of the following statements is false ?*Harrison's 17th Ed. 2009*

- A. Hypertriglyceridemia can precede & cause pancreatitis
- B. >80% patients of acute pancreatitis do not have hypertriglyceridemia
- C. Patients with pancreatitis & hypertriglyceridemia have preexisting abnormalities in lipoprotein metabolism
- D. Fasting Tg levels of < 500 mg/dL pose no risk of pancreatitis

*Fasting Tg levels of < 300 mg/dL pose no risk of pancreatitis.***1384 Drugs that can elevate serum triglycerides include all except ?***Harrison's 18th Ed. 2641*

- A. Progesterone
- B. Vitamin A
- C. Thiazide diuretics
- D. Beta-blockers

*Drugs that can elevate serum Tg are estrogens, vitamin A, thiazides and propanolol.***1385 Deficiency of which of the following have an increased incidence of pancreatitis ?***Harrison's 18th Ed. 2635*

- A. ApoA-I
- B. ApoB-100
- C. ApoC-I
- D. ApoC-II

Both LPL & apoC-II deficiency usually present in childhood with recurrent episodes of severe abdominal pain due to acute pancreatitis. Apolipoprotein CII activates lipoprotein lipase. Triglycerides of chylomicrons are hydrolyzed by LPL, and free fatty acids are released. ApoC-II, which is transferred to circulating chylomicrons from HDL, acts as a required cofactor for LPL in this reaction.

1386 Deficiency of which of the following poses an increased incidence of pancreatitis ?*Harrison's 18th Ed. 2635*

- A. Apolipoprotein CII
- B. Apolipoprotein A-I
- C. Apolipoprotein A-II
- D. All of the above

Patients with deficiency of apolipoprotein CII have an increased incidence of pancreatitis. Apolipoprotein CII activates lipoprotein lipase, which is important in clearing chylomicrons from bloodstream.

1387 What percentage of acute pancreatitis are drug-related ?*Harrison's 18th Ed. 2635*

- A. 2 to 5%
- B. 6 to 12%
- C. 15 to 20%
- D. About 25%

*~ 2 - 5 % of acute pancreatitis are drug-related.***1388 Activation, chemoattraction & sequestration of neutrophils in pancreas occur in which phase of pancreatitis ?***Harrison's 18th Ed. 2636*

- A. Phase 1
- B. Phase 2
- C. Phase 3
- D. Phase 4

Pancreatitis evolves in three phases. Initial phase is characterized by intrapancreatic digestive enzyme activation & acinar cell injury. Second phase involves activation, chemoattraction & sequestration of neutrophils in pancreas resulting in intrapancreatic inflammatory reaction. Third phase is due to effects of activated proteolytic enzymes & cytokines released by inflamed pancreas on distant organs.

1389 Cathepsin B is best related to ?*Harrison's 18th Ed. 2636*

- A. Fat necrosis
- B. Activation of elastase & phospholipase
- C. Zymogen activation
- D. Chemoattraction of neutrophils

Zymogen activation is mediated by lysosomal hydrolases (cathepsin B) which become co-localized with digestive enzymes in intracellular organelles leading to pancreatic acinar cell injury.

1390 In pancreatitis, cellular injury results in liberation of ?*Harrison's 18th Ed. 2636*

- A. Bradykinin peptides
- B. Vasoactive substances
- C. Histamine
- D. All of the above

1391 Which of the following is an accurate predictor of severity & death when measured early in the course of acute pancreatitis ?*Harrison's 18th Ed. 2636*

- A. Bradykinin peptides
- B. Vasoactive substances
- C. Histamine
- D. MCP-1 levels

Monocyte chemotactic protein (MCP-1) levels measured early in the course of acute pancreatitis are an accurate predictor of severity and death.

1392 Which of the following susceptibility gene is a determinant of severity of inflammatory response in pancreatitis ?*Harrison's 18th Ed. 2636*

- A. PRSS1
- B. CFTR
- C. SPINK1
- D. MCP-1

Four susceptibility genes have been identified that can increase the susceptibility and/or modify the severity of pancreatic injury in acute pancreatitis. These are cationic trypsinogen mutations (PRSS1m, R122Hm, and N291), pancreatic secretory trypsin inhibitor (SPINK1), CFTR and monocyte chemotactic protein (MCP-1). MCP-1 may be an important inflammatory mediator in the early pathologic process of acute pancreatitis, a determinant of the severity of the inflammatory response, and a promoter of organ failure.

1393 Which of the following is a risk factor for severe acute pancreatitis ?*Harrison's 17th Ed. 2007*

- A. MCP-1 2516 G allele
- B. MCP-1 2517 G allele
- C. MCP-1 2518 G allele
- D. MCP-1 2519 G allele

MCP-1 2518 G allele polymorphism is a gain-of-function promoter that increases MCP-1 expression. MCP-1 2518 G allele is a risk factor for severe acute pancreatitis.

1394 Which of the following is false about abdominal pain of acute pancreatitis ?*Harrison's 18th Ed. 2636*

- A. Colicky

- B. Radiates to back
- C. More intense in supine position
- D. Located in periumbilical region

Abdominal pain of acute pancreatitis is steady & boring in character.

1395 Abdominal pain due to pancreatitis may have which of the following location ?

Harrison's 18th Ed. 111, Table 13-2

- A. Right Upper Quadrant
- B. Epigastric
- C. Left Upper Quadrant
- D. Any of the above

1396 Exudation of blood & plasma proteins into retroperitoneal space due to activated proteolytic enzymes in acute pancreatitis is termed as ?

Harrison's 18th Ed. 2636

- A. Retroperitoneal abscess
- B. Retroperitoneal tan
- C. Retroperitoneal quinsy
- D. Retroperitoneal burn

Exudation of blood & plasma proteins into retroperitoneal space due to activated proteolytic enzymes in acute pancreatitis is termed as retroperitoneal burn.

1397 Pleural effusion in acute pancreatitis is most frequently ?

Harrison's 18th Ed. 2636

- A. Left-sided
- B. Right-sided
- C. Bilateral
- D. Any of the above

Pleural effusion in acute pancreatitis is most frequently left-sided.

1398 Erythematous skin nodules in acute pancreatitis is due to ?

Harrison's 18th Ed. 2636

- A. Vasculitis
- B. Subcutaneous fat necrosis
- C. Thromboembolism
- D. All of the above

Erythematous skin nodules in acute pancreatitis is due to subcutaneous fat necrosis.

1399 Fat necrosis associated with pancreatic disease is seen in ?

Harrison's 18th Ed. 420

- A. Pancreatic carcinoma
- B. Acute pancreatitis
- C. Chronic pancreatitis
- D. All of the above

Fat necrosis associated with pancreatic disease is secondary to circulating lipases and is seen in pancreatic carcinoma and acute & chronic pancreatitis.

1400 Cullen's sign of severe necrotizing pancreatitis is due to ?

Harrison's 18th Ed. 2636

- A. Pancreatic pseudocyst
- B. DIC
- C. Intestinal ischemia
- D. Hemoperitoneum

Cullen's sign in severe necrotizing pancreatitis refers to a faint blue discoloration around umbilicus as the result of hemoperitoneum.

1401 Turner's sign of severe necrotizing pancreatitis is due to ?

Harrison's 18th Ed. 2636

- A. Tissue catabolism of hemoglobin
- B. Pyoperitoneum
- C. Intestinal ischemia
- D. DIC

Turner's sign of severe necrotizing pancreatitis refers to a blue-red-purple or green-brown discoloration of flanks and reflects tissue catabolism of hemoglobin.

1402 Pearson syndrome is characterized by ?

Harrison's 18th Ed. Chapter e18

- A. Diabetes mellitus from pancreatic insufficiency
- B. Pancytopenia
- C. Lactic acidosis
- D. All of the above

Pearson syndrome is characterized by diabetes mellitus from pancreatic insufficiency with pancytopenia & lactic acidosis, caused by sporadic deletion of several mtDNA genes.

1403 Which of the following about pancreatitis is false ?

Harrison's 18th Ed. 2636

- A. Risk of acute pancreatitis is greater with gallstone <5 mm than larger stones
- B. ~ 25% of acute pancreatitis will have recurrence
- C. Cystic fibrosis is a cause of recurrent pancreatitis
- D. None of the above

Gallstones with a diameter of ~ 5 mm can migrate in bile duct & trigger acute pancreatitis. Gallstones with diameter of >8 mm remain in gallbladder.

1404 Which of the following about acute pancreatitis is false ?

Harrison's 18th Ed. 2636

- A. Pancreatic isoamylase & lipase remain elevated for 7-14 days
- B. Serum amylase is higher in gallstone pancreatitis
- C. Serum lipase higher in alcohol-associated pancreatitis
- D. None of the above

1405 Hyperglycemia in acute pancreatitis is due to ?

Harrison's 18th Ed. 2636

- A. Decreased insulin release
- B. Increased glucagon release
- C. Increased output of adrenal glucocorticoids & catecholamines
- D. All of the above

Hyperglycemia in acute pancreatitis is due to decreased insulin release, increased glucagon release and increased output of adrenal glucocorticoids and catecholamines.

1406 Hypocalcemia may occur in which of the following conditions ?

Harrison's 18th Ed. 362

- A. Burns
- B. Tumor lysis
- C. Pancreatitis
- D. All of the above

Hypocalcemia may occur with severe tissue injury like burns, rhabdomyolysis, tumor lysis, or pancreatitis. Cause of hypocalcemia includes a combination of low albumin, hyperphosphatemia, tissue deposition of calcium, and impaired PTH secretion.

1407 Markers of poor prognosis in severe pancreatitis is ?*Harrison's 18th Ed. 2637*

- A. Elevated serum LDH levels (> 500 U/dL)
- B. Azotemia
- C. Hypoxemia (arterial PO₂ <=60 mm Hg)
- D. All of the above

*Azotemia is a significant risk factor for mortality.***1408 Laboratory studies in acute pancreatitis may show ?***Harrison's 18th Ed. 2637*

- A. Leukocytosis
- B. Hypocalcemia
- C. Hyperglycemia
- D. All of the above

1409 Risk factor for severity in acute pancreatitis is ?*Harrison's 18th Ed. 2637, Table 313-2*

- A. Age > 60 years
- B. Obesity (BMI > 30)
- C. Comorbid disease
- D. All of the above

1410 Which of the following is not included in the bedside index of severity (BISAP) in acute pancreatitis ?*Harrison's 18th Ed. 2637, Table 313-2*

- A. Pao₂ < 60 mmHg
- B. Blood urea nitrogen (BUN) > 22 mg %
- C. Age > 60 years
- D. Impaired mental status

*BISAP or bedside index of severity in acute pancreatitis includes (B) Blood urea nitrogen (BUN) >22 mg%, (I) Impaired mental status, (S) SIRS: 2/4 present, (A) Age >60 years, (P) Pleural effusion***1411 Indicators of a severe attack of pancreatitis are all except ?***Harrison's 17th Ed. 2008*

- A. Age > 70 years
- B. Body mass index (BMI) < 25
- C. Hematocrit > 44%
- D. Admission C-reactive protein > 150 mg/L

*Indicators of a severe attack of pancreatitis are age > 70 years, BMI > 30, Hct > 44% & admission C-reactive protein > 150 mg/L.***1412 Differential diagnosis of acute pancreatitis include ?***Harrison's 18th Ed. 2637*

- A. Perforated viscus
- B. Dissecting aortic aneurysm
- C. Connective tissue disorders with vasculitis
- D. All of the above

*Differential diagnosis of acute pancreatitis includes perforated viscus, acute cholecystitis, acute intestinal obstruction, mesenteric vascular occlusion, renal colic, myocardial infarction, dissecting aortic aneurysm, connective tissue disorders with vasculitis, pneumonia & diabetic ketoacidosis.***1413 Which of the following is true in diabetic ketoacidosis ?***Harrison's 18th Ed. 2639*

- A. Elevated total serum amylase levels
- B. Pancreatic isoamylase levels not elevated
- C. Serum lipase not elevated

- D. All of the above

*Diabetic ketoacidosis is accompanied by abdominal pain & elevated total serum amylase levels. Serum lipase level is not elevated in DKA.***1414 Which investigation is most helpful in differentiating acute cholecystitis from acute pancreatitis ?***Harrison's 17th Ed. 2008*

- A. Serum Lipase
- B. Upper GI Endoscopy
- C. Radionuclide scanning
- D. FP abdomen

*Pain of biliary tract origin is more right-sided or epigastric than periumbilical, ileus is usually absent. Sonography & radionuclide scanning are helpful in diagnosis of cholelithiasis & cholecystitis.***1415 Which of the following determines outcome in majority of difficult to manage cases of acute pancreatitis ?***Harrison's 17th Ed. 2008*

- A. Gastrointestinal bleeding (>500 mL/day)
- B. P_{o2} <= 60 mmHg
- C. Systolic blood pressure < 90 mmHg
- D. Serum creatinine >2.0 mg/dL

*Acute pancreatitis leading to respiratory failure i.e. P_{o2} < 60 mmHg determines outcome in majority of difficult to manage cases.***1416 Abdominal CT of acute pancreatitis patient showed one peripancreatic fluid collection and necrosis of one-third of pancreas - what is the CT severity index ?***Harrison's 18th Ed. 2637, Table 313-3*

- A. 4
- B. 5
- C. 6
- D. 7

1417 Multiple factor scoring system for acute pancreatitis is ?*Harrison's 17th Ed. 2008*

- A. Ranson
- B. Imrie
- C. APACHE II
- D. All of the above

*Ranson, Imrie & Apache II are multiple factor scoring systems for predicting outcome of acute pancreatitis.***1418 Bedside Index of Severity in Acute Pancreatitis (BISAP) incorporates how many clinical and laboratory parameters ?***Harrison's 18th Ed. 2639*

- A. 3
- B. 5
- C. 7
- D. 9

*Bedside Index of Severity in Acute Pancreatitis (BISAP), incorporates five clinical and laboratory parameters obtained within the first 24 hours of hospitalization. Presence of three or more of these factors is associated with substantially increased risk for in-hospital mortality in acute pancreatitis.***1419 Noninfectious etiology of systemic inflammatory response syndrome (SIRS) include which of the following ?***Harrison's 18th Ed. 2228*

- A. Pancreatitis

- B. Adrenal insufficiency
- C. Pulmonary embolism
- D. All of the above

Noninfectious etiologies of SIRS include pancreatitis, burns, trauma, adrenal insufficiency, pulmonary embolism, dissecting or ruptured aortic aneurysm, myocardial infarction, occult hemorrhage, cardiac tamponade, postcardiopulmonary bypass syndrome, anaphylaxis, tumor-associated lactic acidosis, and drug overdose.

1420 SOFA score stands for ?

Lancet 2008; 371: 143-52

- A. Septic organ failure assessment
- B. Surgical organ failure assessment
- C. Symptomatic organ failure assessment
- D. Sequential organ failure assessment

1421 Test that is more specific for acute pancreatitis than serum amylase and lipase is ?

N Engl J Med 2006;354:2142-50

- A. Urine Trypsinogen activation peptide (TAP)
- B. Trypsinogen-2
- C. Abdominal CT & MRI
- D. All of the above

1422 Which of the following tests is more specific for the diagnosis of acute pancreatitis ?

N Engl J Med 2006;354:2142-50

- A. Serum amylase
- B. Serum lipase
- C. Trypsinogen activation peptide
- D. Trypsinogen-4

1423 At 24 hours after admission, the most sensitive & specific predictor of severe acute pancreatitis is ?

N Engl J Med 2006;354:2142-50

- A. APACHE II score ≥ 8
- B. C-reactive protein level >150 mg/dl
- C. PMN elastase >300 $\mu\text{g/liter}$
- D. Urinary TAP >35 nmol/liter

1424 Pancreatic-duct disruption is suspected when ?

N Engl J Med 2006;354:2142-50

- A. Fluid collections with very high levels of pancreatic enzymes
- B. Pseudocysts
- C. Ascites or pleural effusions
- D. All of the above

1425 Recurrent pancreatitis in the absence of biliary disease, alcoholism, and toxic or metabolic causes suggests ?

N Engl J Med 2006;354:2142-50

- A. Pancreas divisum
- B. Duct-obstructing masses
- C. Genetic susceptibility
- D. Any of the above

1426 Test that identifies early pancreatic duct disruption is ?

N Engl J Med 2006;354:2142-50

- A. CT abdomen

- B. MRI abdomen
- C. Transabdominal ultrasound
- D. All of the above

1427 Biliary sludge is made up of ?

Lancet 2008; 371: 143-52

- A. Cholesterol crystals
- B. Calcium bilirubinate granules
- C. Gall bladder mucus
- D. All of the above

Biliary sludge refers to a viscous bile suspension that contains cholesterol crystals and calcium bilirubinate granules embedded in strands of gall bladder mucus.

1428 Which test is more sensitive for identifying gallstones and sludge and for detecting bile-duct dilatation ?

N Engl J Med 2006;354:2142-50

- A. Transabdominal ultrasonography
- B. CT abdomen
- C. MRI abdomen
- D. ERCP

1429 Transabdominal ultrasonography is insensitive for detecting ?

N Engl J Med 2006;354:2142-50

- A. Gallstones and sludge
- B. Bile-duct dilatation
- C. Stones in the distal bile duct
- D. Stones in the proximal bile duct

1430 Which of the following genes may predict severity of acute pancreatitis ?

N Engl J Med 2006;354:2142-50

- A. RET
- B. MCP-1
- C. MEN-1
- D. VHL

1431 Recognized markers of risk of severe acute pancreatitis include all except ?

N Engl J Med 2006;354:2142-50

- A. Elevated C-reactive protein
- B. Ranson's & APACHE II scores
- C. Obesity
- D. High reticulocyte index

1432 Biliary sludge is associated with which of the following ?

Lancet 2008; 371: 143-52

- A. Total parenteral feeding
- B. Long-lasting fast
- C. Distal bile duct obstruction
- D. All of the above

1433 Risk factors for post-ERCP pancreatitis include all except ?

Lancet 2008; 371: 143-52

- A. Old age
- B. Female sex
- C. Number of cannulation attempts of papilla

- D. Poor emptying of pancreatic duct after opacification

Risk of acute pancreatitis is higher when ERCP is done to treat Oddi sphincter dysfunction than to remove bile duct stones. Other risk factors for post-ERCP pancreatitis include young age, female sex, number of cannulation attempts of papilla before success & poor emptying of pancreatic duct after opacification.

1434 The median prevalence of organ failure in necrotizing pancreatitis is ?

Harrison's 18th Ed. 2639

- A. ~ 25 %
B. ~ 50 %
C. ~ 75 %
D. ~ 95 %

The median prevalence of organ failure is 54% in necrotizing pancreatitis.

1435 The mortality in acute pancreatitis with single organ system failure is ?

Harrison's 18th Ed. 2639

- A. ~ 5 %
B. ~ 10 %
C. ~ 25 %
D. ~ 50 %

1436 The mortality in acute pancreatitis with multisystem organ system failure is ?

Harrison's 18th Ed. 2639

- A. ~ 5 %
B. ~ 10 %
C. ~ 25 %
D. ~ 50 %

With single organ system failure, the mortality is 3–10% but increases to 47% with multisystem organ failure.

1437 What proportion of patients with acute pancreatitis have necrotizing pancreatitis ?

Harrison's 18th Ed. 2639

- A. ~ 5 %
B. ~ 10 %
C. ~ 25 %
D. ~ 50 %

Necrotizing pancreatitis occurs in ~10% of all patients with acute pancreatitis.

1438 Necrosis is present in what percentage of patients with acute pancreatitis ?

Harrison's 17th Ed. 2010

- A. 5 - 10 %
B. 12 - 20 %
C. 25 - 45 %
D. 50 - 70 %

Necrosis is present in 12 - 20% of patients with acute pancreatitis.

1439 In what proportion of acute pancreatitis, the disease is self-limited and subsides spontaneously ?

Harrison's 18th Ed. 2640

- A. ~ 25 %
B. ~ 50 %

- C. ~ 75 %

- D. ~ 90 %

In most patients (85 - 90%) with acute pancreatitis, the disease is self-limited and subsides spontaneously, usually within three to seven days after treatment is instituted.

1440 In pancreatitis, oral intake is started by considering all of the following factors except ?

Harrison's 18th Ed. 2641

- A. Resolution of abdominal pain
B. Patient is hungry
C. Organ dysfunction
D. Elevated levels of serum amylase/lipase

Inflammatory changes on CT scan or persistent elevations in serum amylase/lipase may not resolve for weeks to months & should not discourage feeding a hungry asymptomatic patient of pancreatitis.

1441 Which of the following antibiotic is recommended in necrotizing acute pancreatitis ?

Harrison's 17th Ed. 2010

- A. Ciprofloxacin
B. Metronidazole
C. Imipenem cilastin
D. Aztreonam

Current recommendation in necrotizing acute pancreatitis is imipenem cilastin, 500 mg thrice daily for 7 days.

1442 Lexipafant is best related to ?

Harrison's 18th Ed. 2640

- A. Protease inhibitor
B. Platelet-activating factor inhibitor
C. Antibiotic
D. Fungicide

Platelet activating factor (PAF) enhances polymorphonuclear leukocyte (PMN) superoxide production, CD11b expression & elastase release, all essential components in the pathophysiology of multiple-organ failure. Lexipafant (BB-882) is a potent & specific PAF antagonist. It fits in PAF receptors on the surface of cells & blocks activation of these receptors by PAF itself.

1443 Which of the following is used in the management of pancreatitis ?

Harrison's 18th Ed. 357

- A. Nafamostat
B. Pentamidine
C. Tacrolimus
D. Aliskiren

Nafamostat, a protease inhibitor is utilized in the management of pancreatitis, disseminated intravascular coagulation, and extracorporeal circulation (ECC), such as during hemodialysis therapy (HD), plasmapheresis, and cardiopulmonary bypass. It inhibits aldosterone-induced proteases that activate ENaC by proteolytic cleavage. It may cause hyperkalemia.

1444 Besides its use in acute pancreatitis, Lexipafant is also used in ?

Harrison's 17th Ed. 2010

- A. Asthma
B. Glaucoma
C. Alopecia
D. Peripheral arterial disease

Inflammatory agent PAF is implicated in the causation of pancreatitis and asthma.

1445 Aprotinin is best related to which of the following drugs ?

Harrison's 18th Ed. 2640

- A. Lexipafant
- B. Calcitonin
- C. Gabexate mesilate
- D. Octreotide

Aprotinin & gabexate mesilate are broad spectrum antiprotease drugs that reduce pancreatic damage but have no effect on mortality rate in pancreatitis.

1446 Preferred method of nutritional support in patients of necrotizing pancreatitis is ?

Harrison's 18th Ed. 2641

- A. Total parenteral nutrition (TPN)
- B. Feeding with a nasogastric tube
- C. Enteral-feeding with a nasojejunal tube
- D. PEG

Enteral-feeding with a nasojejunal tube has fewer infectious complications than with total parenteral nutrition (TPN) and is the preferred method of nutritional support. Also, enteral feeding helps to maintain integrity of the intestinal tract during severe acute pancreatitis.

1447 What proportion of patients of acute pancreatitis have a recurrence ?

Harrison's 18th Ed. 2641

- A. ~ 25 %
- B. ~ 50 %
- C. ~ 75 %
- D. ~ 90 %

~25% of patients who have had an attack of acute pancreatitis have a recurrence.

1448 Which of the following occult biliary tract diseases can lead to acute pancreatitis ?

Harrison's 18th Ed. 2641

- A. Microlithiasis
- B. Pancreatic cancer
- C. Pancreas divisum
- D. All of the above

If a cause could not be found in patients with recurrent pancreatitis, occult biliary tract disease should be looked at. These include microlithiasis, hypertriglyceridemia, drugs, pancreatic cancer, sphincter of Oddi dysfunction, pancreas divisum, cystic fibrosis, hereditary pancreatitis, choledochocoele; ampullary tumors, pancreatic duct stones, stricture, and tumor.

1449 Necrotic pancreas becomes secondarily infected with ?

Harrison's 18th Ed. 2641

- A. Gram-positive bacteria of alimentary origin
- B. Gram-negative bacteria of alimentary origin
- C. Gram-positive bacteria of hematogenous origin
- D. Gram-negative bacteria of hematogenous origin

Necrotic pancreas becomes secondarily infected in 20-35% of patients, 7-10 days after the onset of acute pancreatitis, most frequently with gram-negative bacteria of alimentary origin.

1450 Pancreatic abscess following acute pancreatitis develops after ?

Harrison's 17th Ed. 2008

- A. 1 weeks
- B. 2 weeks
- C. 3 weeks
- D. 6 weeks

Pancreatic abscess following acute pancreatitis develops usually after 6 weeks.

1451 "Walled-off Necrosis" occurs how many weeks after necrotizing pancreatitis ?

Harrison's 18th Ed. 2641

- A. 1 to 3 weeks
- B. 3 to 6 weeks
- C. 6 to 12 weeks
- D. 12 to 24 weeks

Necrotizing pancreatitis is always associated with peripancreatic necrosis involving the fat around the pancreas. After 3 to 6 weeks, the pancreatic necrosis and peripancreatic fat necrosis fuse together encapsulated by fibrous tissue, adjacent to pancreas. "Walled-off necrosis" refers to this conjoint structure.

1452 Which of the following is false about pancreatic pseudocysts ?

Harrison's 18th Ed. 2641

- A. Extrapancreatic
- B. Collections of pancreatic fluid with pancreatic enzymes
- C. Do not have an epithelial lining
- D. None of the above

Pseudocysts of the pancreas are extrapancreatic collections of pancreatic fluid containing pancreatic enzymes and a small amount of debris. In contrast to true cysts, pseudocysts do not have an epithelial lining. The walls consist of necrotic tissue, granulation tissue, and fibrous tissue.

1453 Walls of pseudocysts consist of ?

Harrison's 18th Ed. 2641

- A. Necrotic tissue
- B. Granulation tissue
- C. Fibrous tissue
- D. All of the above

Pseudocysts of pancreas do not have an epithelial lining. Their walls consist of necrotic tissue, granulation tissue, and fibrous tissue.

1454 The lining of a pancreatic pseudocyst is ?

Harrison's 18th Ed. 2641

- A. Squamous epithelium
- B. Cuboidal epithelium
- C. Granulation tissue
- D. Any of the above

Lining of a pancreatic pseudocyst is granulation tissue from pancreatic duct leakage.

1455 After acute pancreatitis, pseudocysts of pancreas develop over a period of ?

Harrison's 17th Ed. 2011

- A. 1 - 2 weeks
- B. 2 - 3 weeks
- C. 3 - 4 weeks
- D. 4 - 6 weeks

Pseudocysts of pancreas are collections of tissue, fluid, debris, pancreatic enzymes & blood that develop over 4-6 weeks after acute pancreatitis.

1456 Which of the following about pseudocysts of pancreas is false ?

Harrison's 18th Ed. 2642

- A. Preceded by pancreatitis in 90% of cases
- B. Mostly located in body or tail of pancreas
- C. Abdominal pain is the usual presenting complaint
- D. Serum amylase level is mostly normal

Serum amylase level is elevated in 75% of pseudocysts of pancreas at some point during their illness and may fluctuate markedly.

1457 Significant number of pancreatic pseudocysts resolve spontaneously how many weeks after their formation ?

Harrison's 18th Ed. 2642

- A. > 1 week
- B. > 2 weeks
- C. > 4 weeks
- D. > 6 weeks

Significant number of pancreatic pseudocysts resolve spontaneously >6 weeks after their formation.

1458 Complication of a pancreatic pseudocyst is ?

Harrison's 18th Ed. 2642

- A. Rupture
- B. Hemorrhage
- C. Abscess
- D. All of the above

Complications of pancreatic pseudocyst are pain, pressure on other viscera, rupture, hemorrhage & abscess.

1459 Which artery most frequently forms 'Pseudoaneurysm' in acute pancreatitis ?

Harrison's 18th Ed. 2642

- A. Splenic artery
- B. Inferior pancreatic duodenal artery
- C. Superior pancreatic duodenal artery
- D. Hepatic artery

Splenic artery is most often involved, but gastroduodenal, inferior pancreaticoduodenal and superior pancreaticoduodenal arteries can be affected.

1460 Which of the following statements is false for Purtscher's retinopathy ?

Harrison's 18th Ed. 2642

- A. Due to occlusion of anterior retinal artery
- B. Sudden and severe loss of vision
- C. Cotton wool spots & hemorrhages in optical fundus
- D. It is a complication of acute pancreatitis

Purtscher's retinopathy in acute pancreatitis is due to occlusion of posterior retinal artery with aggregated granulocytes. Optical fundus shows cotton-wool spots & hemorrhages confined to an area limited by optic disk & macula.

1461 The fluid in true pancreatic ascites usually has an amylase concentration of ?

Harrison's 17th Ed. 2012

- A. >5000 U/L
- B. >10000 U/L
- C. >15000 U/L
- D. >20000 U/L

1462 Differential diagnosis of pancreatic ascites is ?

Harrison's 18th Ed. 2643

- A. Tuberculous peritonitis
- B. Constrictive pericarditis
- C. Budd-Chiari syndrome
- D. All of the above

Differential diagnosis of pancreatic ascites includes intraperitoneal carcinomatosis, tuberculous peritonitis, constrictive pericarditis, and Budd-Chiari syndrome.

1463 When main pancreatic duct is disrupted posteriorly, internal fistula may develop between pancreatic duct and ?

Harrison's 18th Ed. 2643

- A. Peritoneum
- B. Pleural space
- C. Retroperitoneum
- D. Any of the above

If the pancreatic duct disruption is posterior, an internal fistula may develop between the pancreatic duct and the pleural space, producing a pleural effusion (pancreaticopleural fistula) that is usually left-sided and often massive.

1464 Cardinal complications of chronic pancreatitis is ?

Harrison's 18th Ed. 2643

- A. Abdominal pain
- B. Steatorrhea
- C. Diabetes mellitus
- D. All of the above

Complications of chronic pancreatitis are abdominal pain, steatorrhea, weight loss & diabetes mellitus.

1465 Which of the following is best related to chronic pancreatitis ?

Harrison's 18th Ed. 2643

- A. Fluctuating symptomatology
- B. Risk of malignancy
- C. Irreversible damage to pancreas
- D. All of the above

Chronic pancreatitis is characterized by irreversible damage to pancreas.

1466 There is a strong association of which of the following and chronic pancreatitis ?

Harrison's 18th Ed. 2643

- A. Smoking
- B. Intravenous drug use
- C. Prolonged fasting
- D. Obesity

There is a strong independent, dose-dependent association of smoking and chronic and recurrent acute pancreatitis. Cigarette smoke leads to an increased susceptibility to pancreatic self-digestion and predisposes to dysregulation of duct cell CFTR function. It increases severity in alcohol-induced chronic pancreatitis.

1467 Which of the following plays a key role in the development of chronic pancreatitis ?

Harrison's 18th Ed. 2643

- A. Islet cells of Langerhans
- B. Pancreatic stellate cells (PSC)
- C. Acinar epithelial cells
- D. All of the above

Pancreatic stellate cells (PSC) play a role in maintaining normal pancreatic architecture that can shift toward fibrogenesis in the case of chronic pancreatitis.

1468 Which of the following hypothesis describes events in the pathogenesis of chronic pancreatitis ?

Harrison's 18th Ed. 2643

- A. Sentinel acute pancreatitis event
- B. Sentinel chronic pancreatitis event
- C. Sequential acute pancreatitis event
- D. Sequential chronic pancreatitis event

The sentinel acute pancreatitis event (SAPE) hypothesis uniformly describes the events in the pathogenesis of chronic pancreatitis.

1469 Which of the following induces pancreatic stellate cells (PSC) activity with subsequent new collagen synthesis ?

Harrison's 18th Ed. 2643

- A. Proinflammatory cytokines
- B. Oxidants
- C. Growth factors
- D. All of the above

Proinflammatory cytokines, tumor necrosis factor (TNF- α), interleukin 1 (IL-1), and interleukin 6 (IL-6) as well as oxidant complexes & growth factors are able to induce PSC activity with subsequent new collagen synthesis.

1470 Which of the following plays a role in the self-activating autocrine pathways lead to progression in chronic pancreatitis ?

Harrison's 18th Ed. 2643

- A. Tumor necrosis factor (TNF- α)
- B. Interleukin 1 (IL-1)
- C. Interleukin 6 (IL-6)
- D. Transforming growth factor (TGF- β)

PSCs also possess transforming growth factor (TGF- β)-mediated self-activating autocrine pathways that may explain disease progression in chronic pancreatitis even after removal of noxious stimuli.

1471 Which of the following is the most frequent cause of clinically apparent chronic pancreatitis in children ?

Harrison's 18th Ed. 2644

- A. Cystic fibrosis
- B. Hereditary pancreatitis
- C. Isolated autoimmune chronic pancreatitis
- D. Pancreas divisum

In United States, alcoholism is the most common cause of clinically apparent chronic pancreatitis in adults, while cystic fibrosis is the most frequent cause in children.

1472 In hereditary chronic pancreatitis, defect in gene encoding for which of the following is found ?

Harrison's 18th Ed. 2644

- A. Pepsin
- B. Chymotrypsin
- C. Trypsinogen
- D. All of the above

In hereditary chronic pancreatitis, a genetic defect that affects the gene encoding for trypsinogen was identified. The defect prevents the destruction of trypsinogen and allows it to be resistant to the effect of trypsin inhibitor, become spontaneously activated, and to remain activated leading to continual activation of digestive enzymes within the gland causing acute injury and eventually chronic pancreatitis.

1473 Which of the following mutation increases the risk of chronic pancreatitis ?

Harrison's 18th Ed. 2644

- A. N32S SPINK1
- B. N33S SPINK1
- C. N34S SPINK1
- D. N35S SPINK1

Presence of an N34S SPINK1 mutation increased the risk of chronic pancreatitis by twentyfold. A combination of two CFTR mutations and an N34S SPINK1 mutation increased the risk of chronic pancreatitis 900-fold.

1474 Autoimmune Pancreatitis (AIP) is which form of pancreatitis ?

N Engl J Med 2006;355:2670-6

- A. Acute
- B. Chronic
- C. Recurrent
- D. All of the above

1475 Autoimmune Pancreatitis (AIP) is also called ?

Harrison's 17th Ed. 2013

- A. Sclerosing pancreatitis
- B. Tumefactive pancreatitis
- C. Nonalcoholic destructive pancreatitis
- D. All of the above

AIP is also referred to as sclerosing pancreatitis, tumefactive pancreatitis and nonalcoholic destructive pancreatitis.

1476 Autoimmune pancreatitis is frequently associated with ?

Harrison's 18th Ed. 2644, N Engl J Med 2006;355:2670-6

- A. Rheumatoid arthritis
- B. Sjögren's syndrome
- C. Inflammatory bowel disease
- D. All of the above

AIP is associated with primary sclerosing cholangitis, primary biliary sclerosis, rheumatoid arthritis, Sjögren's syndrome, ulcerative colitis, mediastinal adenopathy, autoimmune thyroiditis, tubulointerstitial nephritis, and retroperitoneal fibrosis.

1477 Majority of patients with AIP present with ?

Harrison's 18th Ed. 2644

- A. Obstructive jaundice
- B. Acute pancreatitis
- C. Recurrent pancreatitis
- D. Malabsorption syndrome

In the United States, 50–75% of patients with AIP present with obstructive jaundice.

1478 Immunologic abnormalities in autoimmune pancreatitis include ?

N Engl J Med 2006;355:2670-6

- A. Hypergammaglobulinemia
- B. Autoantibodies against carbonic anhydrase
- C. Autoantibodies against lactoferrin
- D. All of the above

Autoimmune pancreatitis is characterized by the presence of increased serum gammaglobulin levels (IgG4), presence of autoantibodies (antinuclear antibodies, antilactoferrin antibodies, anticarbonic anhydrase antibodies & rheumatoid factor), pancreatic fibrosis with lymphocytic infiltration & an absence of pancreatic calcification, an association with other autoimmune diseases and response to steroid therapy.

1479 Serum levels of which of the following immunoglobulin is elevated in AIP ?

Harrison's 18th Ed. 2644, 2673

- A. Immunoglobulin G1
- B. Immunoglobulin G2
- C. Immunoglobulin G3
- D. Immunoglobulin G4

IgG constitutes ~75–85% of total serum immunoglobulin. The four IgG subclasses are numbered in order of their level in serum, IgG1 being found in greatest amounts and IgG4 the least. Serum IgG4 normally accounts for only 5–6% of the total IgG in healthy patients but is elevated at least twofold higher than 135 mg/dL in those with AIP.

1480 Which of the following syndrome is related to IgG4 ?*Harrison's 18th Ed. 2369*

- A. IgG4-related immunologic disease
- B. IgG4-related systemic disease
- C. IgG4-related pulmonary disease
- D. IgG4-related neuronal disease

IgG4-related systemic disease is a variety of acute tubulointerstitial disorder and a form of Acute Interstitial Nephritis (AIN). It is characterized by a dense inflammatory infiltrate containing IgG4-expressing plasma cells. Glucocorticoids lead to response.

1481 Which of the following syndrome is related to IgG4 ?*Harrison's 18th Ed. 2627*

- A. Immunoglobulin G4-associated carditis
- B. Immunoglobulin G4-associated neuritis
- C. Immunoglobulin G4-associated pneumonitis
- D. Immunoglobulin G4-associated cholangitis

Immunoglobulin G4-associated cholangitis is a biliary disease of unknown etiology with biochemical & cholangiographic features indistinguishable from PSC. It is associated with autoimmune pancreatitis and is characterized by elevated serum IgG4 and infiltration of IgG4-positive plasma cells in bile ducts and liver tissue. In contrast to PSC, it is not associated with inflammatory bowel disease.

1482 Which of the following is characteristic imaging finding in AIP ?*Harrison's 18th Ed. 2644*

- A. Enlargement at the head of pancreas
- B. Strictures in bile duct
- C. Narrowing of pancreatic bile duct
- D. All of the above

1483 Which of the following drug is useful in AIP ?*Harrison's 18th Ed. 2644*

- A. Glucocorticoids
- B. Azathioprine
- C. 6-mercaptopurine
- D. All of the above

1484 Which of the following is false about chronic pancreatitis ?*Harrison's 18th Ed. 2645*

- A. Deficiencies of fat-soluble vitamins are uncommon
- B. Serum amylase & lipase levels are raised
- C. Best diagnostic test is secretin stimulation test
- D. Vitamin B₁₂ malabsorption is corrected by oral pancreatic enzymes

Serum amylase & lipase levels are normal.

1485 In chronic pancreatitis, secretin stimulation test is abnormal when how much of pancreatic exocrine function is lost ?*Harrison's 18th Ed. 2645*

- A. 20 %
- B. 40 %
- C. 60 %
- D. 80 %

In chronic pancreatitis, secretin stimulation test becomes abnormal when 60% of the pancreatic exocrine function has been lost. This correlates well with the onset of chronic abdominal pain.

1486 Which of the following tests is useful in identifying severe pancreatic exocrine insufficiency ?*Harrison's 18th Ed. 2645*

- A. D-xylose excretion test
- B. Fecal elastase
- C. Serum amylase
- D. Serum lipase

Fecal elastase levels of < 100 µg per gram of stool strongly suggests severe pancreatic exocrine insufficiency.

1487 Severe pancreatic exocrine insufficiency is obvious when serum trypsinogen levels are ?*Harrison's 17th Ed. 2014*

- A. < 20 mg/mL
- B. < 40 mg/mL
- C. < 60 mg/mL
- D. < 80 mg/mL

Decrease of serum trypsinogen level to < 20 mg/mL strongly suggests severe pancreatic exocrine insufficiency.

1488 Absence of pancreatic calcification is a feature of ?*Harrison's 18th Ed. 2644, Table 313-6, Gastroenterology 2007;132:1557-1573*

- A. Idiopathic chronic pancreatitis
- B. Islet cell tumors
- C. Autoimmune Pancreatitis
- D. Severe protein-calorie malnutrition

1489 Most common cause of pancreatic calcification is ?*Harrison's 18th Ed. 2645*

- A. Idiopathic chronic pancreatitis
- B. Hypercalcemic pancreatitis
- C. Alcohol
- D. Severe protein-calorie malnutrition

Alcohol is the most common cause of pancreatic calcification. Diffuse pancreatic calcifications on FP abdomen indicates ~80% damage to pancreas. Pancreatic calcification is also seen in severe protein-calorie malnutrition, hereditary pancreatitis, posttraumatic pancreatitis, hypercalcemic pancreatitis, islet cell tumors, idiopathic chronic pancreatitis and tropical pancreatitis.

1490 Tropical pancreatitis is characterized by all except ?*Gastroenterology 2007;132:1557-1573*

- A. Early onset
- B. Slow progression
- C. Severe pancreatic damage
- D. No history of alcohol abuse or biliary disease

Tropical pancreatitis is characterized by early onset, rapid progression & severe pancreatic damage in the absence of a history of alcohol abuse or biliary disease. Both exocrine & endocrine insufficiency is evident at very early stages, often at the time of presentation in majority (70%) of patients.

1491 Which of the following is an uncommon complication of chronic pancreatitis ?*Harrison's 18th Ed. 2646*

- A. Diabetic ketoacidosis
- B. Pancreatic cancer
- C. Gastrointestinal bleeding
- D. Biliary cirrhosis

In chronic pancreatitis, most patients have impaired glucose tolerance, diabetic ketoacidosis and coma are uncommon.

1492 According to the American Diabetes Association, which of the following diabetes is found in chronic pancreatitis ?

Gastroenterology 2007;132:1557-1573

- A. Type I
- B. Type II
- C. Type IIIc
- D. Any of the above

Diabetes of chronic pancreatitis is classified as type IIIc according to ADA & is characterized by destruction of both insulin & glucagon-producing cells.

1493 Increased incidence of pancreatic carcinoma is seen in which of the following ?

Harrison's 18th Ed. 2646, 2647

- A. Idiopathic chronic pancreatitis
- B. Hypercalcemic pancreatitis
- C. Hereditary pancreatitis
- D. Severe protein-calorie malnutrition

Patients with hereditary pancreatitis develop pancreatic calcification, diabetes mellitus & steatorrhea. They have a tenfold higher risk of pancreatic carcinoma (40% by 70 years).

1494 Source of pancreatic enzymes in treatment of chronic pancreatitis is ?

Harrison's 17th Ed. 2014

- A. Cow
- B. Pig
- C. Human
- D. Horse

Pancreatic enzymes from porcine sources is the cornerstone of pancreatic therapy.

1495 Which of the following significantly relieves pain in severe refractory large-duct chronic pancreatitis ?

Harrison's 17th Ed. 2014, Harrison's 18th Ed. 2646

- A. UDCA
- B. Cholestyramine
- C. Domperidone
- D. Octreotide

Octreotide significantly relieves pain in patients with severe chronic pancreatitis refractory to other forms of therapy, including surgery. In patients with large-duct disease usually from alcohol-induced chronic pancreatitis, ductal decompression has been the therapy of choice.

1496 Small-duct chronic pancreatitis patients who respond best to serine proteases are those with ?

Harrison's 17th Ed. 2014

- A. Abnormal hormone stimulation test
- B. Minimal changes on ERCP
- C. Normal fat absorption
- D. All of the above

1497 The ideal pancreatic enzyme preparation is ?

Harrison's 17th Ed. 2014, Harrison's 18th Ed. 2646

- A. Enteric-coated lipase & free proteases
- B. Enteric-coated lipase & enteric-coated proteases
- C. Free lipase & enteric-coated proteases
- D. Free lipase & free proteases

Ideal pancreatic enzyme preparation is enteric-coated lipase & free proteases. Free proteases enter duodenum & evoke a positive feedback control mechanism & enteric-coated lipase open beyond duodenum & enhance fat absorption. Recent data suggests that dosages up to 80,000-100,000 units of lipase per meal may be necessary to normalize nutritional parameters in malnourished chronic pancreatitis patients.

1498 The major cause of death in alcoholic CP is ?

Gastroenterology 2007;132:1557-1573

- A. Cardiovascular disease
- B. Severe infection
- C. Malignancy
- D. All of the above

Major causes of death in alcoholic CP are cardiovascular disease, infection & malignancy.

1499 The most common congenital anatomic variant of human pancreas is ?

Harrison's 187th Ed. 2648

- A. Annular pancreas
- B. Pancreas divisum
- C. Sphincter of Oddi disorders
- D. Pancreatic duct scars

Pancreas divisum is the most common congenital anatomic variant of the human pancreas.

1500 Which of the following does not predispose to the development of pancreatitis ?

Harrison's 187th Ed. 2648

- A. Hereditary Pancreatitis
- B. Annular Pancreas
- C. Pancreas Divisum
- D. All of the above

Pancreas divisum does not predispose to the development of pancreatitis in the great majority of patients who harbor it.

1501 Macroamylasaemia is characterised by formation of large molecular complexes between amylase and ?

- A. Urea
- B. Haem
- C. Clotting factors
- D. Abnormal immunoglobulins

Macroamylasaemia is a syndrome characterised by formation of large molecular complexes between amylase & abnormal immunoglobulins.

[illegible]

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1 D	33 B	65 D	97 D	129 D	161 C
2 B	34 C	66 D	98 D	130 D	162 D
3 C	35 D	67 C	99 C	131 D	163 A
4 C	36 A	68 B	100 C	132 D	164 A
5 C	37 D	69 D	101 D	133 D	165 C
6 C	38 D	70 D	102 B	134 C	166 B
7 B	39 B	71 D	103 A	135 A	167 D
8 C	40 C	72 C	104 A	136 D	168 B
9 D	41 A	73 C	105 C	137 A	169 D
10 D	42 B	74 D	106 D	138 C	170 D
11 A	43 A	75 B	107 B	139 A	171 A
12 D	44 D	76 D	108 D	140 D	172 B
13 A	45 A	77 B	109 C	141 A	173 C
14 D	46 C	78 D	110 D	142 D	174 D
15 D	47 B	79 C	111 D	143 A	175 C
16 A	48 B	80 C	112 D	144 D	176 B
17 C	49 B	81 C	113 D	145 D	177 B
18 D	50 D	82 B	114 B	146 C	178 D
19 C	51 A	83 C	115 C	147 D	179 B
20 C	52 C	84 D	116 D	148 A	180 C
21 D	53 A	85 A	117 D	149 D	181 C
22 D	54 A	86 B	118 D	150 D	182 B
23 C	55 A	87 D	119 C	151 C	183 C
24 B	56 A	88 D	120 C	152 D	184 D
25 C	57 D	89 D	121 C	153 D	185 A
26 A	58 B	90 A	122 C	154 C	186 D
27 B	59 D	91 C	123 D	155 A	187 A
28 A	60 A	92 A	124 C	156 B	188 C
29 D	61 D	93 C	125 D	157 C	189 D
30 A	62 B	94 A	126 C	158 C	190 C
31 B	63 B	95 D	127 D	159 D	191 D
32 A	64 B	96 A	128 B	160 D	192 B

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193 C	225 C	257 D	289 D	321 A	353 A
194 D	226 C	258 B	290 A	322 D	354 A
195 B	227 D	259 D	291 D	323 B	355 C
196 D	228 A	260 A	292 C	324 C	356 C
197 B	229 C	261 A	293 D	325 D	357 D
198 B	230 B	262 D	294 A	326 B	358 A
199 D	231 B	263 C	295 C	327 B	359 D
200 D	232 C	264 A	296 A	328 A	360 B
201 D	233 C	265 A	297 A	329 D	361 B
202 B	234 C	266 B	298 A	330 D	362 A
203 D	235 C	267 B	299 D	331 B	363 A
204 D	236 A	268 B	300 A	332 C	364 A
205 D	237 C	269 B	301 A	333 A	365 A
206 A	238 A	270 D	302 D	334 B	366 A
207 C	239 B	271 A	303 D	335 D	367 C
208 D	240 A	272 D	304 D	336 B	368 A
209 C	241 C	273 B	305 C	337 D	369 B
210 A	242 D	274 D	306 A	338 D	370 C
211 B	243 D	275 D	307 C	339 D	371 A
212 D	244 C	276 C	308 D	340 D	372 D
213 B	245 D	277 A	309 D	341 D	373 D
214 B	246 A	278 D	310 A	342 D	374 D
215 D	247 A	279 D	311 D	343 D	375 C
216 D	248 C	280 C	312 C	344 D	376 B
217 C	249 C	281 B	313 D	345 D	377 C
218 B	250 A	282 A	314 B	346 D	378 A
219 A	251 B	283 C	315 C	347 B	379 D
220 D	252 D	284 C	316 A	348 A	380 D
221 A	253 D	285 A	317 D	349 D	381 D
222 D	254 C	286 A	318 C	350 A	382 D
223 D	255 D	287 A	319 C	351 D	383 D
224 A	256 A	288 A	320 A	352 B	384 D

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385 C	417 D	449 D	481 B	513 A	545 D
386 D	418 C	450 D	482 B	514 D	546 C
387 D	419 D	451 D	483 C	515 D	547 B
388 A	420 B	452 B	484 A	516 D	548 C
389 A	421 D	453 D	485 D	517 C	549 D
390 A	422 D	454 B	486 C	518 C	550 C
391 B	423 D	455 D	487 B	519 A	551 D
392 C	424 D	456 B	488 C	520 A	552 C
393 B	425 D	457 C	489 A	521 D	553 B
394 D	426 D	458 D	490 A	522 A	554 A
395 B	427 D	459 C	491 A	523 B	555 A
396 C	428 D	460 D	492 B	524 B	556 B
397 D	429 D	461 B	493 D	525 C	557 C
398 C	430 C	462 C	494 B	526 D	558 D
399 B	431 D	463 D	495 A	527 B	559 B
400 D	432 A	464 C	496 D	528 B	560 A
401 D	433 C	465 D	497 A	529 A	561 D
402 C	434 B	466 A	498 C	530 B	562 A
403 B	435 D	467 D	499 D	531 D	563 D
404 C	436 C	468 A	500 D	532 D	564 A
405 B	437 A	469 B	501 D	533 A	565 D
406 C	438 A	470 A	502 B	534 D	566 B
407 B	439 D	471 B	503 C	535 C	567 C
408 C	440 A	472 D	504 C	536 D	568 C
409 B	441 A	473 D	505 B	537 D	569 B
410 B	442 B	474 C	506 B	538 D	570 D
411 A	443 D	475 A	507 C	539 B	571 D
412 D	444 D	476 B	508 D	540 B	572 D
413 C	445 D	477 C	509 C	541 A	573 D
414 A	446 C	478 C	510 C	542 C	574 B
415 D	447 D	479 C	511 B	543 C	575 C
416 D	448 B	480 C	512 A	544 A	576 D

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577 A	609 C	641 A	673 A	705 C	737 D
578 D	610 B	642 C	674 D	706 D	738 A
579 D	611 D	643 D	675 A	707 A	739 D
580 C	612 D	644 B	676 D	708 A	740 D
581 C	613 D	645 C	677 B	709 B	741 A
582 D	614 D	646 C	678 D	710 D	742 C
583 C	615 B	647 D	679 B	711 A	743 D
584 B	616 D	648 C	680 A	712 D	744 D
585 C	617 C	649 B	681 C	713 A	745 D
586 B	618 C	650 B	682 D	714 B	746 B
587 A	619 B	651 B	683 B	715 C	747 D
588 B	620 C	652 D	684 B	716 A	748 C
589 D	621 C	653 D	685 B	717 A	749 A
590 B	622 A	654 C	686 A	718 A	750 A
591 D	623 A	655 B	687 C	719 B	751 D
592 D	624 B	656 D	688 D	720 B	752 D
593 D	625 A	657 D	689 B	721 C	753 D
594 C	626 C	658 D	690 A	722 B	754 D
595 C	627 D	659 B	691 D	723 D	755 B
596 B	628 C	660 D	692 D	724 C	756 C
597 D	629 A	661 D	693 C	725 D	757 D
598 D	630 C	662 A	694 A	726 D	758 C
599 D	631 C	663 B	695 C	727 D	759 D
600 A	632 C	664 D	696 B	728 D	760 A
601 C	633 D	665 B	697 A	729 D	761 D
602 D	634 C	666 D	698 A	730 A	762 B
603 D	635 B	667 B	699 D	731 C	763 C
604 B	636 C	668 D	700 B	732 A	764 C
605 B	637 B	669 A	701 D	733 A	765 D
606 A	638 A	670 D	702 D	734 B	766 A
607 C	639 A	671 B	703 D	735 D	767 C
608 C	640 D	672 C	704 D	736 C	768 B

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769 D	801 B	833 C	865 D	897 D	929 A
770 D	802 D	834 D	866 C	898 D	930 A
771 D	803 A	835 D	867 D	899 D	931 D
772 D	804 B	836 D	868 A	900 A	932 C
773 D	805 A	837 D	869 A	901 A	933 D
774 D	806 D	838 A	870 D	902 B	934 D
775 C	807 A	839 D	871 B	903 C	935 A
776 D	808 D	840 D	872 D	904 C	936 D
777 C	809 B	841 B	873 B	905 C	937 B
778 A	810 B	842 D	874 C	906 C	938 B
779 A	811 C	843 A	875 D	907 D	939 B
780 D	812 D	844 C	876 C	908 D	940 D
781 D	813 A	845 B	877 D	909 A	941 B
782 A	814 B	846 D	878 D	910 D	942 C
783 D	815 D	847 A	879 D	911 D	943 A
784 A	816 B	848 D	880 C	912 D	944 A
785 B	817 B	849 A	881 D	913 D	945 D
786 D	818 D	850 D	882 C	914 D	946 A
787 A	819 C	851 A	883 D	915 D	947 B
788 B	820 D	852 B	884 B	916 D	948 D
789 D	821 C	853 C	885 D	917 D	949 D
790 D	822 D	854 A	886 B	918 D	950 C
791 C	823 A	855 D	887 D	919 D	951 C
792 D	824 C	856 D	888 A	920 D	952 B
793 C	825 A	857 B	889 D	921 D	953 D
794 D	826 C	858 D	890 A	922 D	954 A
795 D	827 D	859 C	891 A	923 B	955 D
796 D	828 D	860 A	892 A	924 B	956 D
797 D	829 C	861 A	893 D	925 D	957 D
798 D	830 D	862 C	894 A	926 D	958 C
799 D	831 B	863 C	895 A	927 C	959 B
800 D	832 D	864 C	896 D	928 C	960 B

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961 A	993 C	1025 C	1057 C	1089 C	1121 D
962 C	994 D	1026 D	1058 A	1090 C	1122 A
963 C	995 D	1027 D	1059 B	1091 D	1123 B
964 B	996 A	1028 D	1060 B	1092 D	1124 B
965 D	997 A	1029 C	1061 C	1093 B	1125 D
966 B	998 D	1030 B	1062 D	1094 B	1126 D
967 A	999 D	1031 B	1063 B	1095 C	1127 D
968 D	1000 B	1032 B	1064 D	1096 A	1128 B
969 D	1001 D	1033 D	1065 C	1097 A	1129 D
970 A	1002 A	1034 D	1066 D	1098 C	1130 A
971 C	1003 D	1035 D	1067 C	1099 B	1131 D
972 A	1004 C	1036 B	1068 C	1100 D	1132 A
973 A	1005 D	1037 C	1069 C	1101 D	1133 C
974 A	1006 B	1038 C	1070 D	1102 D	1134 C
975 D	1007 A	1039 C	1071 A	1103 A	1135 B
976 A	1008 A	1040 D	1072 B	1104 C	1136 B
977 D	1009 C	1041 C	1073 D	1105 A	1137 D
978 A	1010 D	1042 D	1074 D	1106 C	1138 D
979 A	1011 A	1043 D	1075 D	1107 D	1139 D
980 B	1012 B	1044 D	1076 D	1108 D	1140 D
981 C	1013 D	1045 D	1077 D	1109 D	1141 D
982 C	1014 B	1046 B	1078 A	1110 B	1142 D
983 B	1015 D	1047 D	1079 D	1111 D	1143 C
984 D	1016 C	1048 D	1080 C	1112 D	1144 C
985 C	1017 C	1049 C	1081 C	1113 A	1145 C
986 A	1018 B	1050 C	1082 D	1114 B	1146 A
987 D	1019 C	1051 A	1083 D	1115 D	1147 C
988 A	1020 B	1052 D	1084 D	1116 D	1148 A
989 D	1021 D	1053 D	1085 D	1117 D	1149 D
990 D	1022 C	1054 D	1086 D	1118 C	1150 C
991 D	1023 D	1055 B	1087 D	1119 A	1151 D
992 C	1024 A	1056 C	1088 D	1120 D	1152 D

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1153 D	1185 D	1217 D	1249 A	1281 A	1313 A
1154 D	1186 D	1218 D	1250 B	1282 B	1314 D
1155 D	1187 D	1219 D	1251 D	1283 A	1315 D
1156 D	1188 A	1220 D	1252 C	1284 D	1316 C
1157 D	1189 D	1221 D	1253 D	1285 D	1317 A
1158 A	1190 A	1222 B	1254 D	1286 C	1318 C
1159 D	1191 B	1223 C	1255 B	1287 D	1319 B
1160 A	1192 C	1224 C	1256 D	1288 A	1320 A
1161 A	1193 D	1225 D	1257 D	1289 C	1321 B
1162 A	1194 D	1226 C	1258 B	1290 B	1322 C
1163 D	1195 D	1227 B	1259 D	1291 B	1323 B
1164 D	1196 C	1228 C	1260 D	1292 D	1324 C
1165 D	1197 A	1229 D	1261 D	1293 B	1325 A
1166 A	1198 D	1230 C	1262 A	1294 D	1326 A
1167 B	1199 B	1231 B	1263 D	1295 C	1327 D
1168 A	1200 D	1232 D	1264 D	1296 D	1328 B
1169 B	1201 B	1233 C	1265 B	1297 C	1329 A
1170 D	1202 A	1234 D	1266 D	1298 C	1330 D
1171 B	1203 B	1235 C	1267 D	1299 D	1331 B
1172 C	1204 C	1236 B	1268 A	1300 D	1332 B
1173 B	1205 D	1237 A	1269 D	1301 D	1333 C
1174 D	1206 D	1238 B	1270 D	1302 A	1334 C
1175 D	1207 B	1239 D	1271 B	1303 C	1335 D
1176 D	1208 C	1240 C	1272 D	1304 A	1336 D
1177 C	1209 B	1241 D	1273 D	1305 D	1337 C
1178 C	1210 D	1242 A	1274 A	1306 C	1338 A
1179 D	1211 D	1243 D	1275 D	1307 B	1339 B
1180 D	1212 D	1244 D	1276 A	1308 C	1340 D
1181 B	1213 D	1245 A	1277 A	1309 D	1341 D
1182 D	1214 B	1246 A	1278 A	1310 D	1342 D
1183 C	1215 D	1247 C	1279 B	1311 D	1343 C
1184 B	1216 A	1248 D	1280 C	1312 B	1344 D

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1345 D	1377 C	1409 D	1441 C	1473 C
1346 B	1378 B	1410 A	1442 B	1474 B
1347 D	1379 B	1411 B	1443 A	1475 D
1348 B	1380 A	1412 D	1444 A	1476 D
1349 B	1381 D	1413 D	1445 C	1477 A
1350 B	1382 D	1414 C	1446 C	1478 D
1351 B	1383 D	1415 B	1447 A	1479 D
1352 B	1384 A	1416 B	1448 D	1480 B
1353 B	1385 D	1417 D	1449 B	1481 D
1354 B	1386 A	1418 B	1450 D	1482 D
1355 A	1387 A	1419 D	1451 B	1483 D
1356 C	1388 B	1420 D	1452 D	1484 B
1357 B	1389 C	1421 D	1453 D	1485 C
1358 C	1390 D	1422 C	1454 C	1486 B
1359 C	1391 D	1423 C	1455 D	1487 A
1360 B	1392 D	1424 A	1456 D	1488 C
1361 D	1393 C	1425 D	1457 D	1489 C
1362 D	1394 A	1426 B	1458 D	1490 B
1363 C	1395 D	1427 D	1459 A	1491 A
1364 D	1396 D	1428 A	1460 A	1492 C
1365 D	1397 A	1429 C	1461 D	1493 C
1366 D	1398 B	1430 B	1462 D	1494 B
1367 D	1399 D	1431 D	1463 B	1495 D
1368 A	1400 D	1432 D	1464 D	1496 D
1369 B	1401 A	1433 A	1465 C	1497 A
1370 A	1402 D	1434 B	1466 A	1498 D
1371 B	1403 D	1435 A	1467 B	1499 B
1372 D	1404 D	1436 D	1468 A	1500 C
1373 D	1405 D	1437 B	1469 D	1501 D
1374 D	1406 D	1438 B	1470 D	
1375 D	1407 D	1439 D	1471 A	
1376 A	1408 D	1440 D	1472 C	

Chapter 338. Principles of Endocrinology

1 The term hormone, derived from a Greek phrase meaning ?

Harrison's 18th Ed. 2866

- A. "To synchronise"
- B. "To set in motion"
- C. "To rewind"
- D. "To speak"

Starling differentiated between endocrine & exocrine secretions. Word "Hormone" is derived from a Greek phrase meaning "to set in motion".

2 Which of the following is not an amino acid derivative ?

Harrison's 18th Ed. 2866

- A. Dopamine
- B. Catecholamines
- C. Somatostatin
- D. Thyroid hormone

3 Which of the following is not a 'small neuropeptide' class of hormone?

Harrison's 18th Ed. 2866

- A. Gonadotropin-releasing hormone (GnRH)
- B. Thyrotropin-releasing hormone (TRH)
- C. Somatostatin
- D. Luteinizing hormone (LH)

4 Which of the following is not a 'large protein' class of hormone?

Harrison's 18th Ed. 2866

- A. Vasopressin
- B. Insulin
- C. Luteinizing hormone (LH)
- D. PTH

5 Which of the following hormone is "lipid-soluble" ?

Harrison's 18th Ed. 2866

- A. Steroids
- B. Thyroid hormones
- C. Vitamin D
- D. All of the above

6 The glycoprotein hormone family consists of ?

Harrison's 18th Ed. 2866

- A. Thyroid-stimulating hormone (TSH)
- B. Follicle-stimulating hormone (FSH) & LH
- C. Human chorionic gonadotropin (hCG)
- D. All of the above

Hormones are divided into 5 major classes - amino acid derivatives (dopamine, catecholamines & thyroid hormone), small neuropeptides (GnRH, TRH, somatostatin & vasopressin), large proteins (insulin, LH & PTH), steroid hormones (cortisol & estrogen) & vitamin derivatives (vitamin A & D). Amino acid derived & peptide hormones interact with cell-surface membrane receptors. Steroids, thyroid hormones, vitamin D & retinoids are lipid-soluble & interact with intracellular nuclear receptors. Glycoprotein hormones are thyroid-stimulating hormone (TSH), FSH, LH & human chorionic gonadotropin (hCG).

7 Which of the following is not type 1 of nuclear receptor family ?

Harrison's 18th Ed. 2867

- A. GR

- B. MR
- C. AR
- D. TR

8 Which of the following is not type 2 of nuclear receptor family ?

Harrison's 18th Ed. 2867

- A. PR
- B. PPAR
- C. RAR
- D. VDR

According to their specificities for DNA binding sites, nuclear receptor family is classified into type 1 receptors (GR, MR, AR, ER, PR) that bind steroids & type 2 receptors (TR, VDR, RAR, PPAR) that bind thyroid hormone, vitamin D, retinoic acid.

9 Which of the following about hormone receptors is false ?

Harrison's 18th Ed. 2867

- A. ACTH receptors are located exclusively in adrenal cortex
- B. FSH receptors are found only in gonads
- C. Insulin receptors are widely distributed
- D. Thyroid hormone receptors are found only in thyroid gland

Hormone receptors are either membrane or nuclear. Membrane receptors bind peptide hormones & catecholamines. Nuclear receptors bind small molecules that can diffuse across cell membrane like thyroid hormone, steroids & vitamin D. ACTH receptors are located almost exclusively in adrenal cortex, & FSH receptors are found only in gonads. Insulin & thyroid hormone receptors are widely distributed.

10 Hormones that are stored in secretory granules before release are all except ?

Harrison's 18th Ed. 2868

- A. GnRH
- B. Insulin
- C. Steroid hormones
- D. GH

Peptide hormones (GnRH, insulin, GH) are stored in secretory granules before a releasing factor or a neural signal stimulates their release. Steroid hormones diffuse into circulation as they are synthesized.

11 "StAR" refers to ?

Harrison's 18th Ed. 2868

- A. Steroidogenic active regulatory protein
- B. Steroidogenic acute regulatory protein
- C. Steroidogenic action regulatory protein
- D. Steroidogenic augmenting regulatory protein

StAR (steroidogenic acute regulatory protein) transports cholesterol into mitochondrion upon stimulation by ACTH and LH in the steroidogenic pathway.

12 T₄ & T₃ bind to ?

Harrison's 18th Ed. 2868

- A. Thyroxine-binding globulin (TBG)
- B. Albumin
- C. Thyroxine-binding prealbumin (TBPA)
- D. All of the above

T₄ & T₃ bind to thyroxine-binding globulin (TBG), albumin & thyroxine-binding prealbumin (TBPA).

13 Which of the following is a membrane receptor for hormones ?

Harrison's 18th Ed. 2869

- A. GPCR
- B. Tyrosine kinase receptors

- C. Serine kinase receptors
D. All of the above

Membrane receptors for hormones are 7 transmembrane GPCRs, tyrosine kinase receptors, cytokine receptors & serine kinase receptors. Membrane receptors bind peptide hormones & catecholamines.

14 G proteins are so named because ?

Harrison's 18th Ed. 2869

- A. By alphabetical order
B. Growth phase of cell division
C. They bind guanine nucleotides (GTP, GDP)
D. None of the above

G proteins are a large family that form a heterotrimeric complex composed of various α and $\beta\gamma$ subunits. The α subunit contains the guanine nucleotide - binding site & hydrolyzes GTP to GDP. The $\beta\gamma$ subunits modulate the activity of the α subunit besides mediating their own effector signaling pathways.

15 Which of the following mediates signal transduction through adenylate cyclase or phospholipase C ?

Harrison's 18th Ed. 2869

- A. GTP
B. GDP
C. $G\alpha$
D. $G\beta\gamma$

Hormone binding to the receptor induces GDP dissociation, allowing $G\alpha$ to bind GTP & dissociate from the complex. Then, the $G\alpha$ subunit is activated and mediates signal transduction through adenylate cyclase or phospholipase C. GTP hydrolysis to GDP allows reassociation with the $\beta\gamma$ subunits and restores the inactive state.

16 Which of the following is an isoforms of $G\alpha$ subunit ?

Harrison's 18th Ed. 2869

- A. $G_s\alpha$
B. $G_i\alpha$
C. $G_q\alpha$
D. All of the above

There are more than a dozen isoforms of $G\alpha$ subunit. $G_s\alpha$ stimulates, whereas $G_i\alpha$ inhibits adenylate cyclase that generates second messenger cyclic AMP leading to activation of protein kinase A. G_q subunits couple to phospholipase C generating diacylglycerol & inositol triphosphate leading to activation of protein kinase C & release of intracellular calcium.

17 Insulin acts via which of the following membrane receptor for hormones ?

Harrison's 18th Ed. 2869

- A. GPCR
B. Tyrosine kinase receptors
C. Serine kinase receptors
D. Cytokine receptors

Tyrosine kinase receptors transduce signals for insulin & growth factors like IGF-I, epidermal growth factor (EGF), nerve growth factor, platelet-derived growth factor & fibroblast growth factor. Tyrosine kinase receptors play a prominent role in cell growth, differentiation & in intermediary metabolism.

18 Growth hormone (GH) acts via which of the following membrane receptor for hormones ?

Harrison's 18th Ed. 2869

- A. GPCR
B. Tyrosine kinase receptors
C. Serine kinase receptors
D. Cytokine receptor-linked kinase

GH & PRL receptors belong to the cytokine receptor family.

19 The seven transmembrane GPCR family binds all of the following except ?

Harrison's 18th Ed. 2869

- A. LH
B. TRH
C. Calcium
D. Activin

The seven transmembrane GPCR family binds large proteins (LH, PTH), small peptides (TRH, somatostatin), catecholamines (epinephrine, dopamine), and minerals (calcium).

20 Intracellular Janus kinases (JAKs) is related to which of the following receptors ?

Harrison's 18th Ed. 2869

- A. GPCR
B. Tyrosine kinase receptors
C. Serine kinase receptors
D. Cytokine receptors

Janus kinases (JAKs) phosphorylate members of signal transduction & activators of transcription (STAT) family and other signaling pathways (Ras, PI3-K, MAPK). Activated STAT proteins translocate to the nucleus & stimulate expression of target genes.

21 Serine kinase receptors mediate the action of ?

Harrison's 18th Ed. 2870

- A. Activins
B. Transforming growth factor
C. Müllerian-inhibiting substance
D. All of the above

Serine kinase receptors mediate the actions of activins, transforming growth factor, müllerian-inhibiting substance (MIS or anti-müllerian hormone - AMH), and bone morphogenic proteins (BMPs).

22 Smads is related to which of the following membrane receptor for hormones ?

Harrison's 18th Ed. 2870

- A. GPCR
B. Tyrosine kinase receptors
C. Serine kinase receptors
D. Cytokine receptors

Serine kinase receptors (type I & II subunits) signal through proteins called smads (fusion of *Caenorhabditis elegans sma* + mammalian mad).

23 Physiologic function of hormones is ?

Harrison's 18th Ed. 2870

- A. Growth & differentiation
B. Maintenance of homeostasis
C. Reproduction
D. All of the above

Physiologic functions of hormones are growth & differentiation, maintenance of homeostasis & reproduction.

24 Short stature may be due to ?

Harrison's 18th Ed. 2870

- A. GH deficiency
B. Hypothyroidism
C. Cushing's syndrome
D. All of the above

GH deficiency, hypothyroidism, Cushing's syndrome, precocious puberty, malnutrition, chronic illness or genetic abnormalities affecting epiphyseal growth plates (FGFR3 or SHOX mutations) cause short stature.

25 Which of the following does not stimulate growth ?

Harrison's 18th Ed. 2871

- A. GH
- B. IGF-I
- C. Thyroid hormone
- D. Sex steroids

GH, IGF-I & TH stimulate growth, whereas sex steroids lead to epiphyseal closure.

26 Feedback regulation for which of the following does not involve pituitary gland ?

Harrison's 18th Ed. 2871

- A. Leptin
- B. IGF-I
- C. Thyroid hormones
- D. Cortisol

27 Which of the following is not a negative hormonal feedback regulatory system ?

Harrison's 18th Ed. 2872

- A. Thyroid hormones on TRH-TSH axis
- B. Estrogen-mediated stimulation of mid-cycle LH surge
- C. Cortisol on CRH-ACTH axis
- D. Gonadal steroids on GnRH-LH/FSH axis

Following are the negative feedback regulatory systems - thyroid hormones on TRH-TSH axis, cortisol on CRH-ACTH axis, gonadal steroids on GnRH-LH/FSH axis and IGF-I on GHRH-GH axis, calcium feedback on PTH, glucose inhibition of insulin secretion, and leptin feedback on hypothalamus. Positive feedback control is estrogen-mediated stimulation of mid-cycle LH surge.

28 Which of the following is false ?

Harrison's 18th Ed. 2872

- A. Paracrine regulation means factors released by one cell that act on an adjacent cell in the same tissue
- B. Autocrine regulation means action of a factor on the same cell from which it is produced
- C. Levels of paracrine & autocrine control factors cannot be readily measured
- D. None of the above

29 IGF-I acts ?

Harrison's 18th Ed. 2872

- A. Chondrocytes
- B. Breast epithelium
- C. Gonadal cells
- D. All of the above

IGF-I acts on many cells that produce it like chondrocytes, breast epithelium & gonadal cells (autocrine regulation).

Chapter 339. Disorders of the Anterior Pituitary and Hypothalamus

30 The number of major hormones produced by anterior pituitary gland is ?

Harrison's 18th Ed. 2876

- A. 4
- B. 5

C. 6

D. 7

Six major hormones produced by anterior pituitary gland are Prolactin (PRL), Growth hormone (GH), Adrenocorticotropin hormone (ACTH), Luteinizing hormone (LH), Follicle-stimulating hormone (FSH) & Thyroid-stimulating hormone (TSH).

31 The pituitary gland weighs about ?

Harrison's 18th Ed. 2876

- A. 100 mg
- B. 300 mg
- C. 600 mg
- D. 800 mg

Pituitary gland weighs ~600 mg. Located within sella turcica ventral to the diaphragma sella, it comprises anatomically & functionally distinct anterior & posterior lobes.

32 Which of the following about pituitary gland is false ?

Harrison's 18th Ed. 2876

- A. Pituitary hormones are secreted in pulsatile manner
- B. Posterior pituitary is supplied by superior hypophyseal arteries
- C. Posterior lobe is innervated by hypothalamic neurons
- D. None of the above

Major blood supply for anterior pituitary is hypothalamic-pituitary portal plexus which allows effective transmission of hypothalamic peptide pulses to it without significant systemic dilution. Posterior pituitary is supplied by inferior hypophyseal arteries.

33 "Median eminence" is best described as ?

Guyton's Textbook of Medical Physiology 11th Ed. 921

- A. Lowermost portion of hypothalamus
- B. Uppermost portion of pituitary
- C. Lowermost portion of pituitary
- D. Anteriormost portion of pituitary

34 "Tuber cinereum" is best described as ?

Guyton's Textbook of Medical Physiology 11th Ed. 921

- A. Extension of pituitary tissue into pituitary stalk
- B. Extension of hypothalamic tissue into pituitary stalk
- C. Extension of anterior pituitary tissue into pars intermedia
- D. Extension of posterior pituitary tissue into pars intermedia

Pituitary gland is also called hypophysis (anterior pituitary - adenohypophysis, posterior pituitary - neurohypophysis). It is connected to hypothalamus by pituitary (or hypophysial) stalk. Between these two portions of pituitary is a small, relatively avascular zone called pars intermedia. Lowermost portion of hypothalamus is called median eminence, which connects inferiorly with pituitary stalk. Tuber cinereum is an extension of hypothalamic tissue into pituitary stalk. Embryologically, anterior pituitary originates from Rathke's pouch, which is an embryonic invagination of the pharyngeal epithelium, while posterior pituitary originates from a neural tissue outgrowth from hypothalamus.

35 Pit-1, Prop-1, SF-1, and DAX-1 are related to ?

Harrison's 18th Ed. 2877

- A. Hypothalamus development
- B. Pituitary development
- C. Pancreatic development
- D. All of the above

Anterior pituitary gland develops from nasopharyngeal Rathke's pouch. Pit-1, Prop-1, SF-1, and DAX-1 are lineage-specific transcription factors in pluripotential stem cells during embryonic differentiation. Pit-1 determines cell-specific expression of GH (somatotropes), PRL (lactotropes) & TSH (thyrotropes). Prop-1 induces the pituitary development of Pit-1-specific lineages, as well as gonadotropes. Gonadotrope cell development is further defined by the cell-specific expression of nuclear receptors, steroidogenic factor (SF-1) & DAX-1. Corticotropin upstream transcription element (CUTE) & PTX-1 transcription factor play a role in development of corticotrope cells.

36 Pit-1 mutations can cause deficiency of ?

Harrison's 18th Ed. 2877

- A. GH
- B. Prolactin
- C. TSH
- D. All of the above

Autosomal dominant or recessive Pit-1 mutations cause combined GH, PRL & TSH deficiencies resulting in growth failure & hypothyroidism.

37 PROP-1 mutations result in deficiency of all except ?

Harrison's 18th Ed. 2877

- A. GH
- B. Prolactin
- C. ACTH
- D. Gonadotropin

During development, Prop-1 is essential for Pit-1 function. PROP1 mutations result in combined GH, PRL, TSH & gonadotropin deficiency with preservation of ACTH.

38 Kallmann syndrome is due congenital synthesis defect of ?

Harrison's 18th Ed. 2878

- A. LH
- B. FSH
- C. Testosterone
- D. GnRH

Kallmann syndrome is due to defective hypothalamic gonadotropin-releasing hormone (GnRH) synthesis. KAL gene defect on chromosome Xp22.3 is the culprit. Embryonic migration of GnRH neurons from hypothalamic olfactory placode to hypothalamus is prevented due to this genetic defect.

39 Which of the following is not a feature of Kallmann syndrome ?

Harrison's 18th Ed. 2878

- A. Hyposmia
- B. Color blindness
- C. Nerve deafness
- D. Precocious puberty

Features of Kallmann syndrome include anosmia or hyposmia, color blindness, optic atrophy, nerve deafness, cleft palate, renal abnormalities, cryptorchidism & neurologic abnormalities (mirror movements).

40 Hormone profile of Kallmann syndrome includes ?

Harrison's 18th Ed. 2878

- A. Low LH
- B. Low FSH
- C. Low levels of sex steroids (testosterone or estradiol)
- D. All of the above

GnRH deficiency prevents progression through puberty. Males present with delayed puberty & hypogonadism. Females present with primary amenorrhea & failure of secondary sexual development. Repetitive GnRH administration restores normal pituitary gonadotropin responses. Fertility may be restored in men with long-term treatment with human chorionic gonadotropin (hCG) or testosterone. Women are treated with cyclic estrogen & progestin.

41 GnRH deficiency is found in which of the following ?

Harrison's 18th Ed. 2879

- A. Prader-Willi Syndrome
- B. Laurence-Moon-Bardet-Biedl Syndrome
- C. Frohlich Syndrome
- D. All of the above

Laurence-Moon-Bardet-Biedl Syndrome, Frohlich Syndrome & Prader-Willi Syndrome have GnRH deficiency with obesity. Patients of Laurence-Moon-Bardet-Biedl Syndrome have mental retardation,

defects of fingers, retinal degeneration & central diabetes insipidus. Patients of Frohlich Syndrome have hyperphagia, obesity & central hypogonadism. Patients of Prader-Willi Syndrome have mental retardation, adult-onset diabetes mellitus, hyperphagia, obesity & hypogonadotropic hypogonadism.

42 What median dose of cranial irradiation can lead to development of hypopituitarism ?

Harrison's 18th Ed. 2879

- A. 2000 rad
- B. 3000 rad
- C. 4000 rad
- D. 5000 rad

Up to two-thirds of patients ultimately develop hormone insufficiency after a cranial irradiation median dose of 50 Gy (5000 rad) directed at skull base. Hypopituitarism occurs over 5 - 15 years & reflects hypothalamic damage rather than primary destruction of pituitary cells.

43 Which hormone deficiency is most common after cranial irradiation ?

Harrison's 18th Ed. 2879

- A. GH
- B. Gonadotropin
- C. ACTH
- D. ADH

After cranial irradiation, GH deficiency is most common, followed by gonadotropin & ACTH deficiency.

44 Lymphocytic hypophysitis occurs mainly in ?

Harrison's 18th Ed. 2879

- A. Unmarried female
- B. Pregnant female
- C. Short statured female
- D. Infertile female

Lymphocytic hypophysitis occurs mainly in pregnant or post-partum women & presents with hyperprolactinemia & a pituitary mass on MRI, with mildly elevated PRL levels. Resolves after prolonged glucocorticoid treatment.

45 Pituitary apoplexy is associated with ?

Harrison's 18th Ed. 2879

- A. Diabetes
- B. Hypertension
- C. Sickle cell anemia
- D. All of the above

46 Sheehan's syndrome refers to pituitary apoplexy during ?

Harrison's 18th Ed. 2879

- A. Antenatal period
- B. Intra-partum period
- C. Postpartum period
- D. All of the above

Pituitary Apoplexy (acute intrapituitary hemorrhage) may occur spontaneously in a preexisting adenoma, postpartum (Sheehan's syndrome), diabetes, hypertension, sickle cell anemia or acute shock. It presents as severe headache with signs of meningeal irritation, bilateral visual changes, ophthalmoplegia, hypoglycemia, hypotension, CNS hemorrhage & death. Hypopituitarism is very common after apoplexy. Pituitary CT / MRI is diagnostic.

47 Indication for urgent surgical decompression after pituitary apoplexy is ?

Harrison's 18th Ed. 2879

- A. Hypotension
- B. Visual loss
- C. Seizure

- D. All of the above

Patients of pituitary apoplexy with significant or progressive visual loss, severe ophthalmoplegia or loss of consciousness require urgent surgical decompression. Rest can be managed with high-dose glucocorticoids.

48 In 'Empty Sella syndrome', pituitary functions are usually ?

Harrison's 18th Ed. 2879

- A. Normal
B. Decreased
C. Increased
D. Any of the above

Empty Sella patients usually have normal pituitary function. Peripheral rim of pituitary tissue is enough for hormone production, though with time hypopituitarism may develop.

49 ACTH reserve is most reliably assessed by ?

Harrison's 18th Ed. 2880

- A. CRH test
B. Metyrapone test
C. Insulin-induced hypoglycemia
D. Standard ACTH stimulation test

ACTH reserve is most reliably assessed during insulin-induced hypoglycemia.

50 Which of the following can be used to assess GH reserve ?

Harrison's 18th Ed. 2880

- A. Insulin-induced hypoglycemia
B. Arginine
C. L-dopa
D. All of the above

GH responses to insulin-induced hypoglycemia, arginine, L-dopa, growth hormone releasing hormone (GHRH) or growth hormone releasing peptides (GHRPs) can be used to assess GH reserve.

51 Pituitary adenomas account for what percentage of all intracranial neoplasms ?

Harrison's 18th Ed. 2880

- A. ~ 2 %
B. ~ 5 %
C. ~ 15 %
D. ~ 20 %

Pituitary adenomas account for ~15% of all intracranial neoplasms. At autopsy, 25% of all pituitary glands have microadenoma (<10 mm diameter). Pituitary imaging detects small pituitary lesions in at least 10% of normal individuals.

52 Which of the following is false about pituitary adenomas ?

Harrison's 18th Ed. 2880

- A. Monoclonal in origin
B. Benign neoplasms
C. Hormone production does not correlate with tumor size
D. None of the above

Almost all pituitary adenomas are monoclonal in origin due to somatic mutation leading to increased growth. Pituitary adenomas are benign uni- or plurihormonal neoplasms. Pituitary carcinomas with documented extracranial metastases are very rare. Hormone production does not always correlate with tumor size. ~One-third of all adenomas are clinically nonfunctioning & produce no distinct clinical hypersecretory syndrome.

53 "CREB" stands for ?

Harrison's 18th Ed. 2880

- A. Cholesterol response element binding protein
B. Cyclic AMP response element binding protein

- C. Calcium response element binding protein

- D. Cancer response element binding protein

CREB (cyclic adenosine monophosphate responsive element-binding) protein, is a critical transcription factor for neuronal survival which plays an important role in memory in the hippocampus.

54 Factors involved in initiation and promotion of pituitary tumors include ?

Harrison's 18th Ed. 2881

- A. Basic fibroblast growth factor (bFGF)
B. Loss of negative-feedback inhibition
C. Estrogen-mediated or paracrine angiogenesis
D. All of the above

Basic fibroblast growth factor (bFGF) stimulate pituitary cell mitogenesis. Other factors involved in initiation & promotion of pituitary tumors include loss of negative-feedback inhibition & estrogen-mediated or paracrine angiogenesis.

55 Which of the following is a genetic syndrome associated with pituitary tumors ?

Harrison's 18th Ed. 2882

- A. Multiple endocrine neoplasia (MEN) 1
B. Carney syndrome
C. McCune-Albright syndrome
D. All of the above

Genetic predisposition to parathyroid, pancreatic islet & pituitary adenomas occurs in autosomal dominant Multiple endocrine neoplasia (MEN) 1 because "MENIN", the tumor-suppressor gene on chromosome 11q13, is inactivated by mutation. Loss of heterozygosity (LOH) of the remaining normal MENIN allele, leads to tumorigenesis. Carney syndrome is due to mutations in R1 α regulatory subunit of protein kinase A (PRKAR1A). Testicular, adrenal & pituitary adenomas along with spotty skin pigmentation & myxomas are the characteristic features. McCune-Albright syndrome refers to polyostotic fibrous dysplasia, pigmented skin patches, and GH-secreting pituitary tumors, adrenal and ovarian tumours. Hormonal hypersecretion is secondary to cyclic AMP overproduction caused by postzygotic inactivation of GTPase activity of Gs α .

56 Which of the following is not a feature of Hand-Schuller-Christian disease ?

Harrison's 18th Ed. 2883

- A. Diabetes mellitus
B. Exophthalmos
C. Punched-out lytic bone lesions
D. Axillary skin rash

Foci of eosinophilic granulomas are a typical feature of Histiocytosis X. Hand-Schuller-Christian disease refers to a constellation of diabetes insipidus, exophthalmos, punched-out lytic bone lesions & typical axillary skin rash.

57 Craniopharyngiomas arise near which of the following ?

Harrison's 18th Ed. 2883

- A. Pituitary stalk
B. Anterior pituitary
C. Posterior pituitary
D. Hypothalamus

Craniopharyngiomas, derived from Rathke's pouch, arise near the pituitary stalk & extend into suprasellar cistern. They are often large, cystic, locally invasive & partially calcified. They present frequently before age 20, with signs of increased intracranial pressure. Other presentations include visual field abnormalities, personality changes & cognitive deterioration, growth retardation, cranial nerve damage, sleep difficulties, weight gain, anterior pituitary dysfunction & diabetes insipidus.

58 Diabetes insipidus can be caused by ?

Harrison's 18th Ed. 2878

- A. Septo-Optic Dysplasia
B. Bardet-Biedl Syndrome

- C. Transsphenoidal Surgery
- D. All of the above

59 Diabetes insipidus can be caused by ?

Harrison's 18th Ed. 2878

- A. Sarcoidosis
- B. Histiocytosis X
- C. Hemochromatosis
- D. All of the above

60 Diabetes insipidus can be caused by ?

Harrison's 18th Ed. 2878

- A. Craniopharyngiomas
- B. Rathke's cleft cysts
- C. Hand-Schüller-Christian disease
- D. All of the above

61 Diabetes insipidus can be caused by ?

Harrison's 18th Ed. 2878

- A. Pituitary metastases
- B. Brain germ-cell tumors
- C. Amyloidosis
- D. All of the above

62 Blood-borne metastatic deposits in pituitary gland are found mostly in ?

Harrison's 18th Ed. 2883

- A. Anterior pituitary
- B. Posterior pituitary
- C. Pituitary stalk
- D. Any of the above

Pituitary metastases occur in ~3% of cancer patients and blood-borne metastatic deposits are found almost exclusively in posterior pituitary. Diabetes insipidus is the presenting feature.

63 Pallister-Hall syndrome is associated with ?

Harrison's 18th Ed. 2883

- A. Hypothalamic gliomas
- B. Hypothalamic hamartomas
- C. Pituitary metastases
- D. Rathke's cysts

Pituitary failure secondary to lesions around pituitary due to hamartoma along with craniofacial abnormalities, imperforate anus, cardiac, renal & lung disorders is called Pallister-Hall syndrome which is caused by mutations in the carboxy terminus of the GLI3 gene.

64 Hyperthermia results due to lesion in which part of hypothalamus ?

Harrison's 18th Ed. 2883

- A. Anterior and preoptic hypothalamus
- B. Posterior hypothalamus
- C. Ventromedial nuclei
- D. Central hypothalamus

Hemorrhage in anterior & preoptic hypothalamus may cause acute hyperthermia accompanied by paradoxical vasoconstriction & tachycardia.

65 Periodic hypothermia syndrome results due to lesion in which part of hypothalamus ?

Harrison's 18th Ed. 2883

- A. Anterior and preoptic hypothalamus
- B. Posterior hypothalamus
- C. Ventromedial nuclei
- D. Central hypothalamus

Periodic hypothermia syndrome refers to episodic attacks of hypothermia, along with sweating, vasodilation, vomiting & bradycardia. It is due to lesion in posterior hypothalamus.

66 Hyperphagia and obesity results due to lesion in which part of hypothalamus ?

Harrison's 18th Ed. 2883

- A. Anterior and preoptic hypothalamus
- B. Posterior hypothalamus
- C. Ventromedial nuclei
- D. Central hypothalamus

Ventromedial nuclei of hypothalamus contain the energy-satiety responsive melanocortin receptors which are influenced by leptin, insulin, POMC & its products & gastrointestinal peptides. Craniopharyngiomas, trauma or inflammation can cause damage to ventromedial nuclei of hypothalamus leading to hyperphagia & obesity.

67 Central osmo-receptors are located in which part of hypothalamus ?

Harrison's 18th Ed. 2883

- A. Preoptic nuclei of hypothalamus
- B. Posterior hypothalamus
- C. Ventromedial nuclei
- D. Central hypothalamus

Central osmo-receptors are located in preoptic nuclei of hypothalamus. Damage to them is associated with polydipsia & hypodipsia.

68 Elevated serum catecholamine and cortisol levels result due to lesion in which part of hypothalamus ?

Harrison's 18th Ed. 2883

- A. Anterior and preoptic hypothalamus
- B. Posterior hypothalamus
- C. Ventromedial nuclei
- D. Central hypothalamus

Stimulation of sympathetic neurons with consequent elevation of serum catecholamine & cortisol levels occurs due to lesions of central hypothalamus and are predisposed to cardiac arrhythmias, hypertension & gastric erosions.

69 Which of the following is "rare" in the process of expansion of an intrasellar mass ?

Harrison's 18th Ed. 2884 Table 339-7

- A. Compression of intrasellar pituitary tissue
- B. Invasion of dura to lift the optic chiasm
- C. Lateral invasion to impinge on cavernous sinus
- D. Bony erosion

When an intrasellar mass expands, bony erosion & direct brain compression is rare. Compression of intrasellar pituitary tissue is the first event.

70 Which of the following is an abnormal feature of pituitary MRI ?

Harrison's 18th Ed. 2884

- A. Pituitary gland height is <8 mm in adults
- B. Convex upper aspect of adult pituitary
- C. Vertical pituitary stalk
- D. Slightly heterogeneous soft tissue consistency

Pituitary gland height is ~6 mm in children to 8 mm in adults. It increases during pregnancy & puberty to ~10 - 12 mm. Upper aspect of adult pituitary is flat or slightly concave, becomes convex in adolescent & pregnant.

71 Which of the following is false regarding “nonadenomatous pituitary lesions” ?

Harrison's 18th Ed. 2885

- A. Meningiomas are associated with bony hyperostosis
- B. Craniopharyngiomas may be calcified & are hypodense
- C. Gliomas are hyperdense on T2-weighted images
- D. None of the above

When larger pituitary masses (>1 cm) are encountered, they must be distinguished from nonadenomatous lesions like meningioma, craniopharyngiomas & gliomas.

72 On MRI, “pituitary bright spot” is due to ?

Harrison's 18th Ed. 2884

- A. Anterior pituitary
- B. Posterior pituitary
- C. Pituitary stalk
- D. None of the above

73 On MRI, “pituitary bright spot” is due to high content in the posterior pituitary of ?

Harrison's 18th Ed. 2884

- A. Tryptophan
- B. Glucose
- C. Phospholipid
- D. Ascorbic acid

High phospholipid content of posterior pituitary results in a “pituitary bright spot” on MRI.

74 Features of sellar mass lesions involving optic chiasm include ?

Harrison's 18th Ed. 2884 Table 339-7

- A. Loss of red perception
- B. Bitemporal hemianopia
- C. Scotoma
- D. All of the above

75 Loss of red perception is due to pressure on ?

Harrison's 18th Ed. 2885

- A. Optic nerve
- B. Optic chiasm
- C. Optic tract
- D. All of the above

Loss of red perception is an early sign of optic tract pressure. Bitemporal hemianopia or superior bitemporal defects are seen due to pressure of the expanding pituitary tumour because these tracts are located within inferior & posterior part of chiasm. Homonymous field defects are postchiasmal & monocular field cuts are prechiasmal.

76 Which of the following is false about prolactin (PRL) ?

Harrison's 18th Ed. 2887

- A. Normal adult serum PRL levels is 10-25 µg/L in women
- B. Normal adult serum PRL levels is 10-20 µg/L in men
- C. PRL secretion is pulsatile
- D. PRL secretory peaks occur during NREM sleep

77 Which of the following is false about prolactin (PRL) ?

Harrison's 18th Ed. 2887

- A. Peak serum PRL levels occur between 4 - 6 AM

- B. Circulating half-life of PRL is 50 minutes
- C. Predominant central control mechanism is inhibitory
- D. None of the above

Normal adult serum PRL levels are ~10 to 25 µg/L in women & 10 to 20 µg/L in men. PRL secretion is pulsatile, with the highest secretory peaks occurring during rapid eye movement sleep. Peak serum PRL levels occur between 4 & 6 AM. Circulating half-life of PRL is ~50 minutes. Central control mechanism of PRL is inhibitory.

78 Systemic disorder associated with hyperprolactinemia is ?

Harrison's 18th Ed. 2887 Table 339-9

- A. Chronic renal failure
- B. Primary hypothyroidism
- C. Cirrhosis
- D. All of the above

Chronic renal failure elevates prolactin by decreasing peripheral prolactin clearance. Primary hypothyroidism causes hyperprolactinemia because of enhanced TRH secretion.

79 The most common pituitary hormone hypersecretion syndrome in both males and females is ?

Harrison's 18th Ed. 2887

- A. Acromegaly
- B. Hyperprolactinemia
- C. Secondary hyperthyroidism
- D. Cushing's syndrome

80 When PRL level is >200 µg/L, the most common cause is ?

Harrison's 18th Ed. 2887

- A. Pituitary stalk compression
- B. Prolactinoma
- C. Antipsychotic and antidepressant drugs
- D. Pregnancy and lactation

Prolactinomas are the most common cause of PRL levels >200 µg/L. Hypothalamus stimulates production of all anterior pituitary hormones except prolactin, where it has an inhibitory effect. Prolactin inhibitory hormone resembles catecholamine dopamine, secreted by arcuate nuclei of hypothalamus and decreases prolactin secretion. Thus, damage to hypothalamus or blockage of hypothalamic-hypophyseal portal system increases prolactin secretion.

81 “Colostrum” does not contain which of the following ?

Guyton's Textbook of Medical Physiology 11th Ed. 1040

- A. Protein
- B. Lactose
- C. Fats
- D. Calcium

82 Hormonal agents that induce prolactin include ?

Harrison's 17th Ed. 2204 Table 333-8

- A. Estrogens
- B. Antiandrogens
- C. TRH
- D. All of the above

83 Which of the following causes increase in prolactin level ?

Harrison's 18th Ed. 2887

- A. Sleep
- B. Sexual orgasm
- C. Chest stimulation
- D. All of the above

- 84 Which of the following produce “drug-induced hyperprolactinemia” by blocking dopamine receptors ?

Harrison's 18th Ed. 2887 Table 339-9

- A. Chlorpromazine
- B. Haloperidol
- C. Metoclopramide
- D. All of the above

- 85 Which of the following produce “drug-induced hyperprolactinemia” by inhibiting dopamine synthesis ?

Harrison's 18th Ed. 2887 Table 339-9

- A. Alpha-Methyldopa
- B. Metoclopramide
- C. Chlorpromazine
- D. Haloperidol

- 86 Which of the following produce “drug-induced hyperprolactinemia” by depleting catecholamine ?

Harrison's 18th Ed. 2887 Table 339-9

- A. Alpha-Methyldopa
- B. Metoclopramide
- C. Chlorpromazine
- D. Reserpine

- 87 Which of the following produce “drug-induced hyperprolactinemia” by blocking dopamine release ?

Harrison's 18th Ed. 2888

- A. Alpha-Methyldopa
- B. Metoclopramide
- C. Verapamil
- D. Reserpine

Dopamine receptors are blocked by Phenothiazines like chlorpromazine, perphenazine, butyrophenones like haloperidol, thioxanthenes & metoclopramide. Alpha-methyldopa inhibits dopamine synthesis. Reserpine is a catecholamine depletor. Verapamil blocks dopamine release. Estrogens, antiandrogens & TRH induce prolactin.

- 88 Galactorrhea is present in what percentage of hyperprolactinemic women ?

Harrison's 18th Ed. 2888

- A. Up to 80%
- B. Up to 85%
- C. Up to 90%
- D. Up to 95%

- 89 Which of the following is not a presenting feature of hyperprolactinemia in women ?

Harrison's 18th Ed. 2888

- A. Reduced vertebral bone density
- B. Decreased libido
- C. Weight loss
- D. Hirsutism

Chief presentations of hyperprolactinemia in women are oligomenorrhea / amenorrhea, galactorrhea, infertility, reduced vertebral bone mineral density due to hypoeestrogenemia, decreased libido, weight gain & hirsutism.

- 90 What is the normal basal, fasting morning prolactin level ?

Harrison's 18th Ed. 2888

- A. < 5 µg/L

B. < 10 µg/L

C. < 15 µg/L

D. < 20 µg/L

Basal, fasting morning PRL levels are normally <20 g/L. Prolactin secretion occurs in a pulsatile manner & levels vary widely. Assays on multiple occasions may be needed to document hyperprolactinemia. “Macroprolactinemia” refers to biologically inactive aggregated forms of circulating prolactin. It is a cause of false elevation of prolactin levels.

- 91 Breast milk secretion is considered abnormal if it persists for ?

Harrison's 18th Ed. 2888

- A. > 3 months after childbirth or discontinuation of breastfeeding
- B. > 6 months after childbirth or discontinuation of breastfeeding
- C. > 9 months after childbirth or discontinuation of breastfeeding
- D. > 12 months after childbirth or discontinuation of breastfeeding

Galactorrhea, the inappropriate discharge of milk-containing fluid from the breast, is considered abnormal if it persists for > 6 months after childbirth or discontinuation of breastfeeding.

- 92 The female : male ratio for microprolactinomas is ?

Harrison's 18th Ed. 2888

- A. 1:1
- B. 5:1
- C. 10:1
- D. 20:1

- 93 The female:male ratio for macroadenomas is ?

Harrison's 18th Ed. 2888

- A. 1:1
- B. 5:1
- C. 10:1
- D. 20:1

Female:male ratio for microprolactinomas is 20:1, whereas it is 1:1 for macroadenomas. Males tend to present with larger macroadenomas than females because of delay in appreciating signs & symptoms.

- 94 Which of the following is the least common hormone secreted by mixed tumors that secrete prolactin ?

Harrison's 18th Ed. 2888

- A. GH
- B. ACTH
- C. TSH
- D. None of the above

Tumors arising from lactotrope cells account for ~ half of all functioning pituitary tumors. Mixed tumors secreting combinations of GH & PRL, ACTH & PRL & rarely TSH & PRL are also seen.

- 95 For defining “microadenoma” of pituitary gland, what is its cutoff diameter ?

Harrison's 18th Ed. 2888

- A. < 0.2 cm
- B. < 0.5 cm
- C. < 0.8 cm
- D. < 1.0 cm

Pituitary tumours <1 cm in diameter are termed microadenomas. They do not invade parasellar structures. Macroadenomas are >1 cm in diameter and are locally invasive & encroach on surrounding structures.

- 96 If fertility is not desired, what should be the line of management of microadenomas ?

Harrison's 18th Ed. 2889

- A. Dopamine agonists

- B. Surgery
- C. Radiation
- D. No treatment

Pituitary microadenomas are slow growing tumours and only ~5% go on to be macroadenomas. In ~30% of microadenomas, hyperprolactinemia resolves spontaneously. Such asymptomatic patients should be monitored by regular serial prolactin and MRI. No treatment is advocated, if fertility is not desired. However, estrogen replacement may be given to prevent bone loss.

- 97

Dopamine agonists act by ?
Harrison's 18th Ed. 2889
 - A. Suppressing prolactin secretion
 - B. Suppressing prolactin synthesis
 - C. Suppressing lactotrope cell proliferation
 - D. All of the above
- 98

Which of the following is a nonergot oral dopamine agonist ?
Harrison's 17th Ed. 2206
 - A. Pergolide mesylate
 - B. Lisuride
 - C. Quinagolide
 - D. Bromocriptine
- 99

Fungus that produces "Ergot alkaloids" is ?
Harrison's 16th Ed. 2085
 - A. Hortaea werneckii
 - B. Trichosporon asahii
 - C. Sporothrix schenckii
 - D. Claviceps purpurea

Claviceps purpurea is known for epidemics of ergot poisoning (ergotism or St. Anthony's fire). Besides ergot alkaloids, this fungus synthesizes histamine, acetylcholine & tyramine. Bromocriptine, cabergoline & pergolide are ergot alkaloids that have the highest suppressive selectivity for pituitary dopamine D2 receptors. Quinagolide is a nonergot drug with similar D2 receptor affinity. Lysergic acid diethylamide (LSD) is a synthetic ergot compound & its behavioral effects are mediated by agonist effects at prejunctional or postjunctional 5-HT2 receptors in CNS. Cabergoline has a half-life of 63 - 69 hours.

- 100

Salt of bromocriptine used as dopamine receptor agonist for treatment of hyperprolactinemia is ?
Harrison's 18th Ed. 2890
 - A. Acetate
 - B. Mesylate
 - C. Cryptate
 - D. Sulphate
- 101

The most abundant anterior pituitary hormone is ?
Harrison's 18th Ed. 2890
 - A. Prolactin
 - B. TSH
 - C. GH
 - D. ACTH

Of the six anterior pituitary hormones, GH is the most secreted hormone from the GH-secreting somatotrope cells and mammosomatotrope cells, which coexpress PRL with GH.

- 102

Development & proliferation of somatotrophs is determined by which gene ?
Harrison's 18th Ed. 2890
 - A. Prophet of Pit-1 (PROP1)
 - B. Prophet of Pit-2 (PROP2)
 - C. Prophet of Pit-3 (PROP3)

- D. Prophet of Pit-4 (PROP4)

Cell-specific Pit-1 nuclear transcription factor is responsible for development of somatotropes & subsequent transcription of GH. Mutations in transcription factors Pit-1 & Prop-1, which control somatotrope development, cause GH deficiency in combination with other pituitary hormone deficiencies.

- 103

Gene that encode GH is located on which chromosome ?
Harrison's 16th Ed. 2087
 - A. 9
 - B. 12
 - C. 17
 - D. 21
- 104

The name for pituitary GH gene is ?
Harrison's 18th Ed. 2890
 - A. hGH-V
 - B. hGH-N
 - C. hGH-P
 - D. hGH-Z

GH & related proteins are produced by five genes on chromosome 17. The pituitary GH gene (hGH-N) produces two kinds of GH (22-kDa & 20-kDa), both with similar biologic activity. GH variant gene (hGH-V) is expressed by placental syncytiotrophoblast.

- 105

Somatotropin-release inhibiting factor (SRIF) is synthesized in which area of hypothalamus ?
Harrison's 18th Ed. 2890
 - A. Medial preoptic
 - B. Ventromedial nuclei
 - C. Central
 - D. All of the above

Somatostatin [somatotropin-release inhibiting factor (SRIF)] is synthesized in the medial preoptic area of the hypothalamus & inhibits GH secretion.

- 106

Somatotropin-release inhibiting factor (SRIF) or somatostatin is expressed by which of the following ?
Harrison's 18th Ed. 2890
 - A. CNS
 - B. Gastrointestinal tract
 - C. Pancreas
 - D. All of the above

GHRH is secreted as discrete spikes that elicit GH pulses, whereas SRIF sets basal GH tone. SRIF is also expressed in CNS, gastrointestinal tract & pancreas, where it also acts to inhibit islet hormone secretion. IGFI, the peripheral target hormone for GH, feeds back to inhibit GH. Estrogen induces GH whereas glucocorticoid excess suppresses GH release.

- 107

Elevated GH levels occur in all of the following except ?
Harrison's 18th Ed. 2890
 - A. Obesity
 - B. Exercise
 - C. Deep sleep
 - D. Sepsis

GH secretion is pulsatile, with greatest levels at night correlating with onset of sleep. By middle age, GH secretory rates is ~15% than that during puberty. GH secretion is reduced in obese individuals. Elevated GH levels occur within an hour of deep sleep onset as well as after exercise, physical stress, trauma & during sepsis.

- 108

GH secretion is induced by all except ?
Harrison's 18th Ed. 2890
 - A. Dopamine

- B. Apomorphine
- C. β -adrenergic blockage
- D. Somatostatin

GH secretion is induced by dopamine & apomorphine, as well as by α -adrenergic pathways. β -Adrenergic blockage induces basal GH and enhances GHRH- and insulin-evoked GH release.

109 Which somatostatin receptor subtype preferentially suppresses GH secretion ?

Harrison's 18th Ed. 2890

- A. SSTR1
- B. SSTR2
- C. SSTR3
- D. SSTR4

Somatostatin binds to five distinct receptor subtypes (SSTR1 to SSTR5). SSTR2 & SSTR5 subtypes preferentially suppress GH (& TSH) secretion. Somatostatin analogues exert their therapeutic effects through SSTR2 & SSTR5 receptors, both of which are expressed by GH-secreting tumors.

110 Ghrelin is synthesized mainly in ?

N Engl J Med 2006;355:2558-73

- A. Gastrointestinal tract
- B. Peripheral nervous system
- C. Lungs
- D. All of the above

Ghrelin, or octonoylated gastric-derived peptide, as well as synthetic agonists of the GHRP receptor stimulate GHRH & also directly stimulate GH release.

111 IGF-I acts on ?

Harrison's 16th Ed. 2072

- A. Chondrocytes
- B. Breast epithelium
- C. Gonadal cells
- D. All of the above

112 Somatostatin is best described as ?

Guyton's Textbook of Medical Physiology 11th Ed. 921

- A. Corticotropin-releasing hormone (CRH)
- B. Growth hormone releasing hormone (GHRH)
- C. Growth hormone inhibitory hormone (GHIH)
- D. Prolactin inhibitory hormone (PIH)

Growth hormone inhibitory hormone (somatostatin) is a single chain of 14 amino acids Inhibits secretion of growth hormone by somatotropes.

113 Somatomedin C is best described as ?

Guyton's Textbook of Medical Physiology 11th Ed. 924

- A. Growth hormone releasing hormone (GHRH)
- B. Growth hormone inhibitory hormone (GHIH)
- C. Insulin-like growth factor (IGF-1)
- D. None of the above

Growth hormone exerts its effect through intermediate substances called Somatomedins - also called "Insulin-Like Growth Factors" formed in liver under the influence of GH.

114 Which of the following organs has the greatest number of GH receptors ?

Harrison's 18th Ed. 2891

- A. Pancreas
- B. Liver

- C. Heart
- D. Muscle

Liver & cartilage contain the greatest number of GH receptors. GH binding induces receptor dimerization, followed by signaling through JAK/STAT pathway. Activated STAT proteins translocate to the nucleus, where they modulate expression of GH-regulated target genes.

115 Which of the following is an action of GH ?

Harrison's 18th Ed. 2891

- A. Induces protein synthesis
- B. Promotes nitrogen retention
- C. Impairs glucose tolerance by antagonizing insulin action
- D. All of the above

116 Which of the following is an action of GH ?

Harrison's 18th Ed. 2891

- A. Stimulates lipolysis
- B. Promotes sodium, potassium, and water retention
- C. Stimulates epiphyseal prechondrocyte differentiation
- D. All of the above

117 Which of the following is an action of IGF-I ?

Harrison's 18th Ed. 2891

- A. Induces hypoglycemia
- B. Enhances nitrogen retention
- C. Lowers cholesterol level
- D. All of the above

GH impairs glucose tolerance by antagonizing insulin action. While, injected IGF-I induces hypoglycemia, and lower doses improve insulin sensitivity in patients with severe insulin resistance and diabetes.

118 The major source of circulating IGF-I is from ?

Harrison's 18th Ed. 2891

- A. Pancreas
- B. Liver
- C. Heart
- D. Muscle

Major source of circulating IGF-I is liver. IGF-I is a potent growth & differentiation factor. Peripheral tissue IGF-I exerts local paracrine actions that appear to be both dependent & independent of GH.

119 Which fraction of circulating IGF-binding proteins (IGFBP) is a major carrier for circulating IGF-I ?

Harrison's 18th Ed. 2891

- A. IGFBP1
- B. IGFBP2
- C. IGFBP3
- D. All of the above

Both IGF-I and -II are bound to high-affinity circulating IGF-binding proteins (IGFBPs) that regulate IGF bioactivity. Levels of IGFBP3 are GH-dependent, and it serves as the major carrier protein for circulating IGF-I. IGFBP1 & -2 regulate local tissue IGF action but do not bind circulating IGF-I.

120 Which of the following about serum IGF-I concentration is false ?

Harrison's 18th Ed. 2891

- A. Levels peak at 16 years of age
- B. Higher in males than in females
- C. Levels low in sepsis
- D. Levels high in acromegaly

Serum IGF-I levels increase during puberty, peak at 16 years & then decline. IGF-I concentrations are higher in females than in males. GH is the major determinant of hepatic IGF-I synthesis. IGF-I levels are low with cachexia, malnutrition & sepsis (hypocaloric states are associated with GH resistance). Though GH levels are increased in sepsis, IGF-I levels decrease due to GH resistance. In acromegaly, IGF-I levels are invariably high.

121 Hormones promoting growth include all except ?

Harrison's 18th Ed. 2891

- A. GH
- B. IGF-I
- C. IGF-II
- D. Cytokines

Skeletal maturation & somatic growth is promoted by hormonal stimuli like GH, IGF-I, sex steroids, thyroid hormones, paracrine growth factors & cytokines.

122 In later childhood, mean growth velocity is about ?

Harrison's 18th Ed. 2891

- A. 2 cm/year
- B. 4 cm/year
- C. 6 cm/year
- D. 8 cm/year

Linear bone growth rates are very high in infancy & are pituitary dependent. Mean growth velocity is ~6 cm/year in later childhood. Peak growth rates occur during midpuberty when bone age is 12 (girls) or 13 (boys). Secondary sexual development is associated with elevated sex steroids that cause progressive epiphyseal growth plate closure.

123 The growth-promoting process consumes what proportion of normal energy production ?

Harrison's 18th Ed. 2891

- A. ~ 10 %
- B. ~ 20 %
- C. ~ 30 %
- D. ~ 40 %

Growth-promoting process requires caloric energy, amino acids, vitamins & trace metals & consumes ~10% of normal energy production. Malnutrition impairs chondrocyte activity & reduces circulating IGF-I & IGFBP3 levels.

124 Normal bone age in a child with short stature is suggestive of ?

Harrison's 18th Ed. 2891

- A. Hormonal disorder
- B. Systemic disorder
- C. Genetic cartilage dysplasia or growth plate disorder
- D. All of the above

125 Delayed bone age in a child with short stature is suggestive of ?

Harrison's 18th Ed. 2891

- A. Hormonal disorder or systemic disorder
- B. Genetic cartilage dysplasia
- C. Growth plate disorder
- D. All of the above

Bone age is delayed in patients with all forms of true GH deficiency or GH receptor defects that result in attenuated GH action. Bone age is delayed by thyroid hormone deficiency. Elevated pubertal sex steroid levels (estrogen) induce GHRH-GH-IGF-I axis & directly stimulate epiphyseal growth. High doses of estrogen lead to epiphyseal closure. Glucocorticoid excess inhibits growth.

126 Characteristic voice in isolated GH deficiency is ?

Harrison's 18th Ed. 2891

- A. High-pitched
- B. Low-pitched

- C. Hoarse
- D. Any of the above

Isolated GH deficiency is characterized by short stature, micropenis, increased fat, high-pitched voice & a tendency for hypoglycemia.

127 Familial modes of inheritance of isolated GH deficiency may be ?

Harrison's 18th Ed. 2891

- A. Autosomal dominant
- B. Autosomal recessive
- C. X-linked
- D. Any of the above

128 Which of the following is false about Laron syndrome ?

Harrison's 18th Ed. 2892

- A. GH insensitivity
- B. Normal or high GH levels
- C. Decreased circulating GHBP
- D. High IGF-I levels

Laron syndrome is caused by mutation defects of GH receptor structure or signaling leading to partial or complete GH insensitivity & growth failure. The diagnosis is based on normal or high GH levels, with decreased circulating GHBP, and low IGF-I levels.

129 Following provocative stimuli, GH levels normally increase to how much in children ?

Harrison's 18th Ed. 2892

- A. > 3 µg/L
- B. > 5 µg/L
- C. > 7 µg/L
- D. > 9 µg/L

As GH secretion is released in pulses, GH deficiency is best assessed by examining the response to exercise, insulin-induced hypoglycemia wherein GH levels normally increase to >7 µg/L in children.

130 Final height of children can be predicted by ?

Harrison's 18th Ed. 2892

- A. Bayley-Pinneau scale
- B. Tanner-Whitehouse scale
- C. Midparental height
- D. All of the above

Final height can be predicted using standardized scales (Bayley-Pinneau or Tanner-Whitehouse) or estimated by adding 6.5 cm (boys) or subtracting 6.5 cm (girls) from the midparental height.

131 Treatment with IGF-I is recommended for which of the following ?

Harrison's 18th Ed. 2892

- A. Turner syndrome
- B. Chronic renal failure
- C. Growth retardation due to mutations of GH receptor
- D. All of the above

In patients with GH insensitivity & growth retardation due to mutations of GH receptor, treatment with IGF-I bypasses the dysfunctional GH receptor. GH treatment is moderately effective for accelerating growth rates in children with Turner syndrome & chronic renal failure.

132 Which is the "last" hormone to be lost in acquired pituitary hormone deficiency ?

Harrison's 18th Ed. 2892

- A. TSH

- B. GH
- C. ACTH
- D. FSH/LH

Sequential order of hormone loss in acquired pituitary hormone deficiency is GH > FSH/LH > TSH > ACTH.

133 Adult GH deficiency (AGHD) is defined by a peak GH response to hypoglycemia of ?

Harrison's 18th Ed. 2893

- A. <3 µg/L
- B. <5 µg/L
- C. <7 µg/L
- D. <9 µg/L

Most validated test to distinguish pituitary-sufficient patients from those with AGHD is insulin induced (0.05 - 0.1 U/kg) hypoglycemia. After glucose reduction to ~40 mg/dL, most individuals experience neuroglycopenic symptoms, and peak GH release occurs at 60 minutes & remains elevated for up to 2 hours. ~90% of healthy adults exhibit GH responses >5 µg/L. AGHD is defined by a peak GH response to hypoglycemia of <3 µg/L.

134 Contraindications to GH therapy include ?

Harrison's 18th Ed. 2893

- A. Presence of active neoplasm
- B. Intracranial hypertension
- C. Uncontrolled diabetes
- D. All of the above

Contraindications to GH replacement therapy include presence of an active neoplasm, intracranial hypertension or uncontrolled diabetes & retinopathy.

135 Acidophil stem cell pituitary adenoma can lead to ?

Harrison's 18th Ed. 2893

- A. Hypogonadism
- B. Galactorrhea
- C. Acromegaly
- D. All of the above

In patients with acidophilic stem-cell adenomas, features of hyperprolactinemia (hypogonadism & galactorrhea) predominate over the less clinically evident signs of acromegaly.

136 Mammosomatotrope pituitary adenoma can lead to ?

Harrison's 18th Ed. 2893

- A. Hypogonadism
- B. Galactorrhea
- C. Acromegaly
- D. All of the above

Mammosomatotrope produce GH, PRL & can present with a clinical syndrome of acromegaly, hypogonadism & galactorrhea of varying degrees.

137 Normal daytime circulating levels of Growth Hormone is ?

N Engl J Med 2006;355:2558-73

- A. < 0.2 µg/liter
- B. < 0.3 µg/liter
- C. < 0.4 µg/liter
- D. < 0.5 µg/liter

138 The production of IGF-I is suppressed in ?

N Engl J Med 2006;355:2558-73

- A. Liver disease
- B. Hypothyroidism

- C. Poorly controlled diabetes mellitus
- D. All of the above

139 Familial syndromes associated with acromegaly include ?

N Engl J Med 2006;355:2558-73

- A. MEN type 1
- B. McCune-Albright syndrome
- C. Carney's syndrome
- D. All of the above

140 Which of the following organs is not enlarged in acromegaly ?

N Engl J Med 2006;355:2558-73

- A. Tongue
- B. Thyroid gland
- C. Parotid gland
- D. Heart

141 Which of the following organs is not enlarged in acromegaly ?

N Engl J Med 2006;355:2558-73

- A. Liver
- B. Pancreas
- C. Kidney
- D. Prostate

Generalized visceromegaly occurs in acromegaly, including cardiomegaly, macroglossia, and thyroid gland enlargement.

142 The most common cause of GHRH-mediated acromegaly is ?

Harrison's 18th Ed. 2893

- A. Pancreatic islet cell tumor
- B. Pheochromocytoma
- C. Abdominal carcinoid tumor
- D. Medullary thyroid carcinoma

Most common cause of GHRH-mediated acromegaly is a chest or abdominal carcinoid tumor. Excessive GHRH may be secreted by hypothalamic tumors, usually choristomas or neuromas.

143 Prognathism is due to enlargement of ?

Harrison's 18th Ed. 2894

- A. Maxilla
- B. Mandible
- C. Nasal bones
- D. All of the above

144 Acromegaly is associated with an increased risk of which of the following malignancies ?

Harrison's 18th Ed. 2894

- A. Pancreatic
- B. Colonic
- C. Breast
- D. Thyroid

Acromegaly is associated with an increased risk of colon polyps and colonic malignancy. Polyps are diagnosed in up to one-third of acromegalic patients.

145 Which of the following regarding acromegaly is false ?

Harrison's 18th Ed. 2894

- A. Often clinically not diagnosed for 10 years or more
- B. Without treatment, survival is reduced by ~10 years

- C. Hypertension occur in about 75% of patients
- D. Diabetes mellitus develops in 25% of patients

In acromegaly, cardiovascular system is most severely affected. Coronary heart disease, cardiomyopathy with arrhythmias, left ventricular hypertrophy, decreased diastolic function & hypertension occur in about 30% of patients. Diabetes mellitus develops in 25% of patients with acromegaly. Overall mortality is increased ~threefold and is due primarily to cardiovascular & cerebrovascular disorders, malignancy & respiratory disease. Without proper treatment, survival is reduced by an average of 10 years compared with an age-matched control population.

146 For the diagnosis of acromegaly, measurement of which of the following is most useful ?

Harrison's 18th Ed. 2895

- A. GH
- B. GHRH
- C. IGF-I
- D. IGF-II

Due to the pulsatility of GH secretion, measurement of a single random GH level is not useful for the diagnosis or exclusion of acromegaly and does not correlate with disease severity. IGF-I level provides a useful laboratory screening measure when clinical features raise the possibility of acromegaly.

147 In acromegaly, following oral glucose load, GH levels remain more than ?

Harrison's 18th Ed. 2895

- A. > 0.1 µg/liter
- B. > 0.2 µg/liter
- C. > 0.3 µg/liter
- D. > 0.4 µg/liter

Diagnosis of acromegaly is confirmed by demonstrating failure of GH suppression to <0.4 µg/L within 1 to 2 hours of 75 gram oral glucose load.

148 In GH-secreting microadenomas, which of the following is the preferred primary treatment for most patients ?

Harrison's 18th Ed. 2895

- A. Surgical resection
- B. Somatostatin analogues
- C. Dopamine agonists
- D. Irradiation

Surgery is the preferred primary treatment for GH secreting microadenomas. The high frequency of GH hypersecretion after macroadenoma resection usually necessitates adjuvant or primary medical therapy for these larger tumors. Patients unable to receive or respond to medical treatment can be offered radiation.

149 Which of the following is false about Octreotide ?

Harrison's 18th Ed. 2895

- A. Synthetic somatostatin analogue
- B. 40 times more potent than native somatostatin
- C. Administered subcutaneously
- D. None of the above

150 Which of the following is a side effect of Octreotide ?

Harrison's 18th Ed. 2896

- A. Tachycardia
- B. Cholesterol gallstones
- C. Hypoglycemia
- D. All of the above

Octreotide suppresses postprandial gallbladder contractility & delays GB emptying. ~30% of patients treated with long-term Octreotide develop echogenic sludge or asymptomatic cholesterol gallstones. Octreotide suppresses gastrointestinal motility & secretion. It may also produce mild glucose intolerance due to transient insulin suppression, asymptomatic bradycardia, hypothyroxinemia & local pain at the injection site.

151 Which of the following act by antagonizing endogenous GH binding to its receptor ?

Harrison's 18th Ed. 2896

- A. Cabergoline
- B. Lanreotide
- C. Octreotide acetate
- D. Pegvisomant

Pegvisomant is a GH analogue that antagonizes endogenous GH action by blocking peripheral GH binding to its receptor. Consequently, serum IGF-I levels are suppressed, potentially reducing the deleterious effects of excess endogenous GH. Cabergoline suppresses GH. Bromocriptine suppresses GH secretion particularly those with cosecretion of PRL. Lanreotide is a cyclic somatostatin octapeptide analogue that suppresses GH & IGF-I hypersecretion. Sandostatin-LAR is a long-acting formulation of octreotide causing GH suppression.

152 What proportion of pituitary cell population are ACTH-secreting corticotrope cells ?

Harrison's 18th Ed. 2896

- A. ~ 10 %
- B. ~ 20 %
- C. ~ 30 %
- D. ~ 40 %

ACTH-secreting corticotrope cells constitute ~20% of pituitary cell population.

153 Besides ACTH, POMC precursor protein also produces which of the following peptides ?

Harrison's 18th Ed. 2896

- A. β-lipotropin
- B. β-endorphin
- C. Met-enkephalin
- D. All of the above

154 Besides ACTH, POMC precursor protein also produces which of the following peptides ?

Harrison's 18th Ed. 2896

- A. α melanocyte-stimulating hormone (MSH)
- B. β-endorphin
- C. Corticotropin-like intermediate lobe protein (CLIP)
- D. All of the above

ACTH (39 amino acids) is derived from POMC precursor protein (266 amino acids) that also produces β-lipotropin, β-endorphin, met-enkephalin, α melanocyte-stimulating hormone (MSH) & corticotropin-like intermediate lobe protein (CLIP).

155 POMC gene is induced by ?

Harrison's 18th Ed. 2896

- A. CRH
- B. Arginine vasopressin (AVP)
- C. IL-6
- D. All of the above

POMC gene is powerfully suppressed by glucocorticoids & induced by CRH, arginine vasopressin (AVP) & proinflammatory cytokines, including IL-6 & leukemia inhibitory factor.

156 Peak ACTH secretion occurs at ?

Harrison's 18th Ed. 2896

- A. 4 AM
- B. 6 AM
- C. 8 AM
- D. 10 AM

ACTH secretion is pulsatile with circadian rhythm, peaking at 6 AM & reaching a nadir around midnight.

157 ACTH levels are increased by ?*Harrison's 18th Ed. 2896*

- A. AVP
- B. Physical stress
- C. Insulin-induced hypoglycemia
- D. All of the above

ACTH circadian rhythmicity is determined by variations in secretory pulse amplitude rather than changes in pulse frequency. ACTH levels are increased by AVP, physical stress, exercise, acute illness & insulin-induced hypoglycemia.

158 The receptor for ACTH is ?*Harrison's 18th Ed. 2896*

- A. Melanocortin-1 receptor
- B. Melanocortin-2 receptor
- C. Melanocortin-3 receptor
- D. Melanocortin-4 receptor

Receptor for ACTH is melanocortin-2 receptor, a member of GPCR group, that induces steroidogenesis by stimulating a cascade of steroidogenic enzymes in adrenal cells.

159 In ACTH deficiency, total daily dose of hydrocortisone replacement therapy should not exceed ?*Harrison's 18th Ed. 2896*

- A. 10 mg daily
- B. 20 mg daily
- C. 25 mg daily
- D. 40 mg daily

In ACTH deficiency, total daily dose of hydrocortisone replacement should not exceed 25 mg daily.

160 Most common cause of cushingoid features is ?*Harrison's 18th Ed. 2897*

- A. Pituitary corticotrope adenoma
- B. Iatrogenic hypercortisolism
- C. Ectopic tumor ACTH production
- D. Cortisol-producing adrenal adenoma

Pituitary corticotrope adenomas account for 70% of patients with endogenous causes of Cushing's syndrome. However, iatrogenic hypercortisolism is the most common cause of cushingoid features.

161 What percentage of all pituitary tumors are ACTH-producing adenomas ?*Harrison's 18th Ed. 2897*

- A. 2 to 5%
- B. 5 to 10%
- C. 10 to 15%
- D. 15 to 20%

ACTH-producing adenomas account for ~10 to 15% of all pituitary tumors.

162 Hematopoietic features of hypercortisolism include ?*Harrison's 18th Ed. 2897*

- A. Leukocytosis
- B. Lymphopenia
- C. Eosinopenia
- D. All of the above

Hematopoietic features of hypercortisolism include leukocytosis, lymphopenia, and eosinopenia.

163 Diameter of most ACTH-secreting pituitary tumors is ?*Harrison's 18th Ed. 2898*

- A. < 2 mm
- B. < 5 mm
- C. < 8 mm
- D. < 10 mm

Most ACTH-secreting pituitary tumors are <5 mm in diameter & about half are undetectable by sensitive MRI.

164 Primary cause of death in patients of Cushing's syndrome is ?*Harrison's 18th Ed. 2898*

- A. Cardiovascular disease
- B. Infections
- C. Suicide
- D. Renal failure

Primary cause of death in Cushing's syndrome is cardiovascular disease, but infections and risk of suicide are also increased.

165 Rapid development of skin hyperpigmentation, severe myopathy, hypertension, hypokalemic alkalosis & edema suggests the possibility of ?*Harrison's 18th Ed. 2897-98*

- A. Pituitary corticotrope adenoma
- B. Iatrogenic hypercortisolism
- C. Ectopic tumor ACTH production
- D. Cortisol-producing adrenal adenoma

Rapid development of features of hypercortisolism associated with skin hyperpigmentation & severe myopathy suggests ectopic production of ACTH. Hypertension, hypokalemic alkalosis, glucose intolerance & edema are also more pronounced. Serum potassium levels <3.3 mmol/L are evident in ~70% of patients with ectopic ACTH secretion but are seen in <10% of patients with pituitary-dependent Cushing's disease.

166 Most reliable test for confirmation of pituitary ACTH-secreting adenomas is ?*Harrison's 18th Ed. 2898*

- A. 24-h urine free cortisol (UFC)
- B. Bilateral inferior petrosal sinus ACTH sampling
- C. Overnight 1-mg dexamethasone suppression test
- D. Basal plasma ACTH levels

Small pituitary ACTH-secreting adenomas (<2 mm) may go undetected by gadolinium enhancement pituitary MRI. Bilateral inferior petrosal sinus ACTH sampling distinguishes pituitary ACTH-secreting adenomas from ectopic ACTH-secreting tumors. An increased ratio (>2) of inferior petrosal : peripheral vein ACTH confirms pituitary Cushing's disease.

167 Mean basal ACTH levels are about how many times higher in patients with ectopic ACTH secretion as compared to pituitary ACTH-secreting adenomas ?*Harrison's 18th Ed. 2898*

- A. 3
- B. 5
- C. 8
- D. 12

Mean basal ACTH levels are about eightfold higher in patients with ectopic ACTH secretion compared to those with pituitary ACTH-secreting adenomas.

168 Endocrinopathies that frequently have associated hyperpigmentation include ?*Harrison's 18th Ed. 2899*

- A. Addison's disease

- B. Nelson syndrome
- C. Ectopic ACTH syndrome
- D. All of the above

Endocrinopathies that frequently have associated hyperpigmentation include Addison's disease, Nelson syndrome & ectopic ACTH syndrome.

169 Which of the following is false about Nelson's syndrome ?

Harrison's 18th Ed. 2899

- A. Pituitary enlargement
- B. Increased skin pigmentation
- C. High ACTH levels
- D. None of the above

Nelson's syndrome is a disorder characterized by rapid pituitary tumor enlargement and increased pigmentation secondary to high ACTH levels. Adrenalectomy in the setting of residual corticotrope adenoma tissue predisposes to its development. Radiation therapy may be indicated to prevent the development of Nelson's syndrome after adrenalectomy.

170 In treatment of Cushing's disease, which of the following drugs is useful ?

Harrison's 18th Ed. 2899

- A. Ketoconazole
- B. Metyrapone
- C. Mitotane
- D. All of the above

In Cushing's disease, steroidogenic inhibitors are used in combination with pituitary irradiation to block the adrenal effects of persistently high ACTH levels. Ketoconazole is an antimycotic drug that inhibits several P450 enzymes. Metyrapone inhibits 11 β -hydroxylase activity & Mitotane suppresses cortisol hypersecretion by inhibiting 11 β -hydroxylase and cholesterol side-chain cleavage enzymes & by destroying adrenocortical cells.

171 In treatment of Cushing's disease, which of the following drugs is useful ?

Harrison's 18th Ed. 2899

- A. Aminoglutethimide
- B. Cyproheptadine
- C. Etomidate
- D. All of the above

Aminoglutethimide, trilostane, cyproheptadine & etomidate block steroidogenesis and are useful in treatment of Cushing's disease.

172 Which out of the following clinical features of Cushing's syndrome is most common ?

Harrison's 18th Ed. 2897 Table 339-12

- A. Hypertension
- B. Purple skin striae
- C. Thin skin
- D. Truncal obesity

173 Which out of the following clinical features of Cushing's Syndrome is most common ?

Harrison's 18th Ed. 2897 Table 339-12

- A. Acne
- B. Hirsutism
- C. Hyperpigmentation
- D. Bruising

Clinical features of Cushing's Syndrome in order of frequency are : Obesity, Thin skin, Moon facies, Hypertension, Purple skin striae, Hirsutism, Menstrual disorders, Plethora, Abnormal glucose tolerance, Impotence, Proximal muscle weakness, Truncal obesity, Acne, Bruising, Mental changes, Osteoporosis, Edema of lower extremities, Hyperpigmentation, Hypokalemic alkalosis, Diabetes mellitus.

174 What percentage of anterior pituitary cells are gonadotrope cells ?

Harrison's 18th Ed. 2899

- A. 5 %
- B. 10 %
- C. 15 %
- D. 20 %

Gonadotrope cells comprise ~10% of anterior pituitary cells and produce two gonadotropins LH & FSH.

175 Specificity of gonadotropins, LH and FSH, is conferred by which subunit ?

Harrison's 18th Ed. 2899

- A. α
- B. β
- C. γ
- D. δ

LH & FSH are glycoprotein hormones (like TSH & hCG) & consist of α & β subunits. The α subunit is common to these glycoprotein hormones, specificity is conferred by the β subunits, which are expressed by separate genes.

176 Which of the following is the smallest amino-acid peptide ?

Harrison's 18th Ed. 2899

- A. Hypothalamic GnRH
- B. ACTH
- C. Corticotropin releasing hormone (CRH)
- D. POMC precursor protein

Hypothalamic GnRH is a 10-amino-acid peptide. ACTH has 39 amino acids derived from POMC precursor protein which has 266 amino acids. CRH is a 41-amino-acid hypothalamic peptide synthesized in paraventricular nucleus.

177 GnRH is secreted in discrete pulses every ?

Harrison's 18th Ed. 2899

- A. 5 to 10 minutes
- B. 10 to 30 minutes
- C. 30 to 60 minutes
- D. 60 to 120 minutes

Hypothalamic GnRH regulates synthesis & secretion of both LH & FSH. GnRH is secreted in discrete pulses every 60 to 120 minutes, which in turn elicit LH & FSH pulses. Pulsatile mode of GnRH release prime gonadotrope responsiveness, whereas continuous GnRH exposure induces desensitization.

178 FSH hormone is under control of which of the following ?

Harrison's 18th Ed. 2899

- A. Inhibin
- B. Activin
- C. GnRH
- D. All of the above

Inhibin selectively suppresses FSH synthesis, whereas activin stimulates FSH synthesis. GnRH induces FSH secretion. Inhibin & activin are gonadal peptides & are members of transforming growth factor β (TGF- β) family.

179 Which of the following statements is false ?

Harrison's 18th Ed. 2899

- A. In women, FSH stimulates ovarian estrogen production
- B. In women, LH helps maintain corpus luteum
- C. In men, LH induces testosterone synthesis & secretion by Leydig cells
- D. None of the above

180 Most common presenting feature of adult hypopituitarism is ?*Harrison's 18th Ed. 2899*

- A. Hypothyroidism
- B. Hypogonadism
- C. Addison's disease
- D. Hyperprolactinemia

Hypogonadism is the most common presenting feature of adult hypopituitarism, even when other pituitary hormones are also deficient.

181 Acquired GnRH deficiency causing hypogonadotropism can be due to ?*Harrison's 18th Ed. 2899*

- A. Anorexia nervosa
- B. Stress
- C. Starvation
- D. All of the above

Acquired forms of GnRH deficiency leading to hypogonadotropism are seen in association with anorexia nervosa, stress, starvation & extreme exercise, but may also be idiopathic. Hypogonadotropic hypogonadism in these disorders is reversed by removal of the stressful stimulus.

182 Which of the following is the characteristic skin change in hypogonadal adult males ?*Harrison's 18th Ed. 2900*

- A. Petechiae
- B. Fine facial wrinkles
- C. Coarse thickened skin
- D. Skin tags

In hypogonadal adult males, secondary testicular failure is associated with decreased libido & potency, infertility, decreased muscle mass with weakness, reduced beard and body hair growth, soft testes, and characteristic fine facial wrinkles.

183 Most clinically nonfunctioning adenomas originate from ?*Harrison's 18th Ed. 2900*

- A. Somatotrophe cells
- B. Corticotrophe cells
- C. Gonadotrophe cells
- D. Lactotrophe cells

Most clinically nonfunctioning adenomas originate from gonadotrophe cells. These tumors typically produce small amounts of intact gonadotropins (usually FSH) as well as uncombined α and LH β and FSH β subunits. Tumor secretion may lead to elevated α & FSH β subunits and, rarely, to increased LH β subunit levels. Some adenomas express α subunits without FSH or LH.

184 In patients with gonadotrope adenomas, administration of which of the following stimulates LH β subunit secretion ?*Harrison's 18th Ed. 2900*

- A. TRH
- B. TSH
- C. ACTH
- D. CRH

In majority of patients with gonadotrope adenomas, TRH administration stimulates LH β subunit secretion. This response is not seen in normal individuals.

185 Which of the following is false in men with gonadotropin-secreting tumors ?*Harrison's 18th Ed. 2900*

- A. Increased gonadotropins (LH > FSH)
- B. Pituitary mass
- C. Low testosterone levels

- D. None of the above

In men, gonadotropin-secreting tumors may be diagnosed because of slightly increased gonadotropins (FSH > LH) in the setting of a pituitary mass. Testosterone levels are usually low, despite the normal or increased LH level, perhaps reflecting reduced LH bioactivity or the loss of normal LH pulsatility.

186 Clinically inapparent somatotrope adenoma is best excluded by ?*Harrison's 18th Ed. 2900*

- A. Normal IGF-I value
- B. Normal IGF-II value
- C. Normal GH value
- D. All of the above

Clinically inapparent somatotrope or corticotrope adenomas can be excluded by a normal IGF-I value and normal 24-hour urinary free cortisol levels. If PRL levels are <100 g/L in a patient with pituitary mass, a nonfunctioning adenoma causing pituitary stalk compression should be considered.

187 In the treatment of nonfunctioning pituitary tumors, which of the following reduces adenoma size ?*Harrison's 18th Ed. 2900*

- A. Dopamine agonists
- B. Octreotide
- C. Nal-Glu GnRH
- D. None of the above

Nonfunctioning pituitary tumors respond poorly to dopamine agonists, octreotide and selective GnRH antagonist, Nal-Glu GnRH.

188 TSH-secreting thyrotrope cells comprise what percentage of anterior pituitary cell population ?*Harrison's 18th Ed. 2901*

- A. 2 %
- B. 5 %
- C. 8 %
- D. 12 %

TSH-secreting thyrotrope cells comprise 5% of the anterior pituitary cell population. Gonadotrope cells comprise about 10% of anterior pituitary cells. GH-secreting somatotrope cells constitute up to 50% of the total anterior pituitary cells. Lactotropes comprise about 20% of anterior pituitary cells.

189 TSH is structurally related to ?*Harrison's 18th Ed. 2901*

- A. GH
- B. PRL
- C. FSH
- D. ACTH

TSH is structurally related to LH & FSH. It shares a common α subunit with these hormones but contains a specific TSH β subunit.

190 Hypothalamic tripeptide - TRH is also called ?*Harrison's 18th Ed. 2901*

- A. Pyroglutamyl histidylprolinamide
- B. Proglutamyl histidylprolinamide
- C. Pentaglutamyl histidylprolinamide
- D. Preglutamyl histidylprolinamide

TRH is a hypothalamic tripeptide (pyroglutamyl histidylprolinamide) that acts through a GPCR to stimulate TSH synthesis & secretion.

191 Besides TSH, TRH also stimulates secretion of ?*Harrison's 18th Ed. 2901*

- A. PRL

- B. GH
- C. ACTH
- D. Vasopressin

TRH also stimulates the lactotrope cell to secrete PRL.

192 TSH secretion is suppressed by ?

Harrison's 18th Ed. 2901

- A. Dopamine
- B. SRIF
- C. Glucocorticoids
- D. All of the above

TSH secretion is stimulated by TRH, whereas thyroid hormones, dopamine, SRIF & glucocorticoids suppress TSH by overriding TRH induction.

193 Which of the following is secreted in pulses ?

Harrison's 16th Ed. 2077, 2092, 2087, 2096

- A. GnRH
- B. ACTH
- C. GH
- D. All of the above

Like TSH, GnRH, ACTH, GH, LH & FSH are secreted in pulses.

194 Which of the following has the longest half life ?

Harrison's 18th Ed. 2901

- A. TSH
- B. ACTH
- C. GH
- D. Prolactin (PRL)

TSH has a prolonged half-life with relatively constant serum levels, even though it is secreted in discrete pulses. ACTH, GH, prolactin, PTH, LH have relatively short half-lives (<20 min) with sharp peaks of secretion & decay.

195 Which of the following is not useful in suppressing TSH secretion in TSH-producing macroadenomas ?

Harrison's 16th Ed. 2096

- A. Dopamine agonists
- B. Octreotide
- C. Lanreotide
- D. All of the above

Dopamine agonists are rarely effective for suppressing TSH secretion from TSH-secreting adenomas. Octreotide markedly suppresses TSH, causing biochemical hypothyroidism that requires concomitant thyroid hormone replacement. Lanreotide, a long acting somatostatin analogue, effectively suppresses TSH.

Chapter 340. Disorders of the Neurohypophysis

196 Structure of arginine vasopressin (AVP) is ?

Harrison's 18th Ed. 2902

- A. Five-membered disulfide ring with tripeptide tail
- B. Six-membered disulfide ring with tripeptide tail
- C. Seven-membered disulfide ring with tripeptide tail
- D. Eight-membered disulfide ring with tripeptide tail

AVP is a nona-peptide composed of a six-membered disulfide ring and a tripeptide tail.

197 Which of the following is not synthesized via a polypeptide precursor ?

Harrison's 18th Ed. 2902

- A. AVP
- B. Neurophysin
- C. Neuropeptide Y
- D. Copeptin

AVP secretion is synthesized via a polypeptide precursor that includes AVP, neurophysin & copeptin - all encoded by a single gene on chromosome 20..

198 ADH is synthesized in which of the following ?

Harrison's 18th Ed. 2902

- A. Hypothalamus
- B. Anterior pituitary gland
- C. Posterior pituitary gland
- D. All of the above

199 ADH is released by which of the following ?

Harrison's 18th Ed. 2902

- A. Hypothalamus
- B. Anterior pituitary gland
- C. Posterior pituitary gland
- D. All of the above

Antidiuretic hormone (ADH) is synthesized in supraoptic nuclei of hypothalamus and released by the posterior pituitary gland.

200 Absence of AVP produces which of the following ?

Harrison's 18th Ed. 2903

- A. Osmotic diuresis
- B. Water diuresis
- C. Electrolyte diuresis
- D. Ionic diuresis

Without AVP, cells that line distal tubule & medullary collecting ducts of kidney reabsorb little of the large volume of dilute filtrate that enters from proximal nephron resulting in excretion of very large volumes (0.2 mL/kg per min) of maximally dilute urine (specific gravity ~1.000 & osmolarity 50 mosmol/L). This is called "Water diuresis".

201 Which of the following is related to the action of AVP ?

Harrison's 18th Ed. 2903

- A. Aquaporin 1
- B. Aquaporin 2
- C. Aquaporin 3
- D. Aquaporin 4

AVP action is mediated via binding to G protein coupled V2 receptors on the serosal surface of the cells that line distal tubule & medullary collecting ducts of kidney, activation of adenylyl cyclase & insertion into luminal surface of water channels composed of a protein called aquaporin 2.

202 At high concentrations, AVP action includes ?

Harrison's 18th Ed. 2903

- A. Smooth muscle contraction of blood vessels & GI tract
- B. Glycogenolysis in liver
- C. Potentiates ACTH release by corticotropin-releasing factor
- D. All of the above

All the above effects are mediated by V1a or V1b receptors that are coupled to phospholipase C.

203 AV3V region that controls osmolarity is located in ?

Harrison's 17th Ed. 2217

- A. Hypothalamus
- B. Anterior pituitary gland
- C. Posterior pituitary gland
- D. Third ventricle

AV3V region is located along the anteroventral region of third ventricle and plays a role in controlling osmolarity and ADH secretion.

204 Which of the following stimuli increase ADH secretion ?

Harrison's 18th Ed. 2903

- A. Increased blood osmolarity
- B. Decreased arterial pressure
- C. Decreased blood volume
- D. All of the above

In addition to increased blood osmolarity, decreased arterial pressure and decreased blood volume increase ADH secretion.

205 Osmoreceptors are present in ?

Harrison's 18th Ed. 2903

- A. Hypothalamus
- B. Posterior pituitary
- C. Kidney
- D. All of the above

Osmoreceptors are specialized hypothalamic cells that control AVP secretion through 'effective' osmotic pressure of body fluids.

206 Osmoreceptors are extremely sensitive to small changes in the plasma concentration of which of the following ?

Harrison's 18th Ed. 2903

- A. Sodium
- B. Urea
- C. Glucose
- D. All of the above

Osmoreceptors are extremely sensitive to small changes in plasma concentration of sodium but are insensitive to solutes like urea or glucose.

207 The average threshold, or set point, for AVP release corresponds to a plasma osmolarity of about ?

Harrison's 18th Ed. 2903

- A. 280 mosmol/L
- B. 285 mosmol/L
- C. 290 mosmol/L
- D. 295 mosmol/L

Average threshold or set point for AVP release corresponds to a plasma osmolarity of ~ 280 mosmol/L.

208 The average threshold or set point for AVP release corresponds to a plasma sodium of about ?

Harrison's 18th Ed. 2903

- A. 125 meq/L
- B. 130 meq/L
- C. 135 meq/L
- D. 140 meq/L

Average threshold or set point for AVP release corresponds to a plasma sodium of about 135 meq/L.

209 In healthy adults, the set point of osmoregulatory system can be lowered by ?

Harrison's 18th Ed. 2903

- A. Pregnancy
- B. Menstrual cycle
- C. Acute reductions in blood pressure or volume
- D. All of the above

Set point of osmoregulatory system can be lowered by pregnancy, menstrual cycle, relatively large acute reductions in blood pressure or volume.

210 Which of the following stimulate AVP secretion ?

Harrison's 18th Ed. 2903

- A. Nausea
- B. Acute hypoglycemia
- C. Glucocorticoid deficiency
- D. All of the above

AVP secretion is stimulated by nausea, acute hypoglycemia, glucocorticoid deficiency, smoking and hyperangiotensinemia.

211 Emetic center is located in ?

Harrison's 18th Ed. 2903

- A. Medulla
- B. Midbrain
- C. Pons
- D. Cerebellum

Nausea is an extremely potent stimuli & causes immediate, 50- to 100-fold increases in plasma AVP. Emetic stimuli act via emetic center in medulla & can be completely blocked by antiemetics.

212 AVP clearance is due to degradation in ?

Harrison's 18th Ed. 2904

- A. Liver
- B. Kidneys
- C. Placenta
- D. All of the above

AVP has a half life of 10 to 30 minutes. Most AVP clearance is due to degradation in liver and kidneys. During pregnancy, metabolic clearance of AVP is increased three- to four fold due to placental production of an N-terminal peptidase.

213 Thirst osmostat is 'set' about how much higher than the AVP osmostat ?

Harrison's 18th Ed. 2904

- A. 2 %
- B. 3 %
- C. 4 %
- D. 5 %

Thirst is regulated primarily by an osmostat that is located in anteromedial hypothalamus. Thirst osmostat is 'set' ~5% higher than AVP osmostat.

214 Of the fluid filtered by the kidneys, what percentage is reabsorbed isosmotically in proximal tubules ?

Harrison's 18th Ed. 2903 Figure 340-2

- A. 30 %
- B. 50 %
- C. 80 %
- D. 95 %

In a 70-kg healthy adult, kidney filters about 180 L/day of plasma. Of this, ~144 L (80%) is reabsorbed isosmotically in proximal tubule & 8 L (4 - 5%) is reabsorbed without solute in descending limb of Henle's loop. Remainder is diluted to an osmolarity of ~60 mmol/kg by selective reabsorption of sodium & chloride in the ascending limb.

215 Under AVP influence, solute-free water is reabsorbed osmotically through which of the following cells ?

Harrison's 18th Ed. 2903 Figure 340-2

- A. Principal cells
- B. Intercalated cells
- C. Mesangial cells
- D. All of the above

Under AVP influence, solute-free water is reabsorbed osmotically through principal cells of collecting ducts.

216 Which of the following aquaporin water channels is located on apical membrane of principal cells of the collecting duct ?

Harrison's 18th Ed. 2903 Figure 340-2

- A. Aquaporin 1
- B. Aquaporin 2
- C. Aquaporin 3
- D. Aquaporin 4

Aquaporin 2 (AQP 2) water channels are located on the apical membrane. AQP 3 and AQP 4 water channels are located on the basal-lateral surface and water diffuses out of the cell through them.

217 Antidiuretic effect of AVP is mediated via which of the following receptors ?

Harrison's 16th Ed. 2098

- A. Receptor tyrosine kinase
- B. Cytokine receptor-linked kinase
- C. G protein-coupled seven-transmembrane (GPCR)
- D. Serine Kinase

Antidiuretic effect of AVP is mediated via a G protein-coupled V2 receptor that increases intracellular cyclic AMP, thereby inducing translocation of aquaporin 2 (AQP 2) water channels into the apical membrane resulting in an increase in permeability that permits influx of water that diffuses out of the cell through AQP 3 and AQP 4 water channels on the basal-lateral surface.

218 Which of the following clinical features of diabetes insipidus is false ?

Harrison's 18th Ed. 2904

- A. Daily urine volume is >50 mL/kg body weight
- B. Urine osmolarity is <300 mosmol/L
- C. Dehydration is common
- D. Enuresis is common

In diabetes insipidus, due to decreased secretion or action of AVP urine volume is >50 mL/kg body weight/day & urine osmolarity is <300 mosmol/L. Polyuria produces urinary frequency, enuresis, and/or nocturia, thirst & polydipsia. Clinical signs of dehydration are uncommon unless fluid intake is impaired.

219 Primary diabetes insipidus is also called ?

Harrison's 18th Ed. 2904

- A. Neurohypophyseal DI
- B. Pituitary DI
- C. Central DI
- D. Any of the above

Primary DI results from agenesis or irreversible destruction of neuro-hypophysis and is also called neurohypophyseal DI, pituitary DI, or central DI.

220 Which of the following is a primary polydipsia ?

Harrison's 18th Ed. 2904

- A. Dipsogenic DI
- B. Psychogenic polydipsia
- C. Iatrogenic polydipsia

D. All of the above

Secondary deficiency of AVP due to inhibition of AVP secretion by excessive intake of fluids is called primary polydipsia. Dipsogenic DI is characterized by an inappropriate increase in thirst caused by a reduction in the 'set' of osmoregulatory mechanism. Psychogenic polydipsia is not associated with thirst & polydipsia is a feature of psychosis. In iatrogenic polydipsia there is increase fluid intake on recommendations of health professionals or media.

221 Wolfram's syndrome includes ?

Harrison's 18th Ed. 2904

- A. Diabetes insipidus
- B. Diabetes mellitus
- C. Optic atrophy
- D. All of the above

Wolfram's syndrome includes diabetes insipidus, diabetes mellitus, optic atrophy, and neural deafness (DIDMOAD)]. It is an autosomal recessive disorder due to mutations of WFS 1 gene.

222 In gestational DI, offending substance that produces deficiency of AVP comes from ?

Harrison's 18th Ed. 2904

- A. Placenta
- B. Foetus
- C. Uterus
- D. All of the above

A primary deficiency of plasma AVP can also result from increased metabolism by an N-terminal aminopeptidase produced by the placenta. It is referred to as gestational DI.

223 Urine concentration ceases when secretion or action of AVP is reduced to what level of normal ?

Harrison's 18th Ed. 2904

- A. 30 %
- B. 50 %
- C. 80 %
- D. 100 %

When secretion or action of AVP is reduced to ~80 to 85% of normal, urine concentration ceases & the rate of output increases to symptomatic levels.

224 Which of the following increases plasma AVP levels ?

Harrison's 18th Ed. 2904

- A. Nausea
- B. Smoking
- C. Vasovagal reaction
- D. All of the above

Nausea, smoking & vasovagal reaction increases plasma AVP to produce profound antidiuresis.

225 In primary or metastatic malignancies, ectopic AVP production results from abnormal expression of which gene ?

Harrison's 18th Ed. 2908

- A. AVP-NPI
- B. AVP-NPII
- C. AVP-NPIII
- D. AVP-NPIV

Ectopic production of AVP result from abnormal expression of AVP-NPII gene by primary or metastatic malignancies.

226 What value of rise in blood glucose leads to decrease in serum sodium of about 1 meq/L ?

Harrison's 18th Ed. 2910

- A. 18 mg/dL

- B. 36 mg/dL
- C. 54 mg/dL
- D. 72 mg/dL

Serum sodium decreases ~1 meq/L for each 36 mg/dL rise in glucose.

227 Each decrease in serum sodium of 1 meq/L reduces plasma osmolarity by about ?

Harrison's 18th Ed. 2910

- A. 1 mosmol/L
- B. 2 mosmol/L
- C. 3 mosmol/L
- D. 4 mosmol/L

Each decrease in serum sodium of 1 meq/L reduces plasma osmolarity by about 2 mosmol/L.

228 Central pontine myelinolysis is characterized by all except ?

Harrison's 18th Ed. 2910

- A. Quadripareisis
- B. Ataxia
- C. Paresthesias
- D. Abnormal extraocular movements

Central pontine myelinolysis is characterized by quadripareisis, ataxia & abnormal extraocular movements.

229 In treatment of hyponatremia in SIADH with hypertonic saline, maximum rise in serum sodium level should not be more than ?

Harrison's 18th Ed. 2910

- A. 6 mmol/L
- B. 8 mmol/L
- C. 10 mmol/L
- D. 12 mmol/L

230 Pituitary bright spot is almost always present in patients with ?

Harrison's 18th Ed. 2906

- A. Pituitary diabetes insipidus
- B. Nephrogenic diabetes insipidus
- C. Primary polydipsia
- D. All of the above

In MRI of pituitary & hypothalamus of healthy beings, posterior pituitary emits a hyperintense signal in T1-weighted mid-sagittal images. This "pituitary bright spot" is almost always present in patients with primary polydipsia but is invariably absent or abnormally small in patients with pituitary DI, it is small or absent in nephrogenic DI because of high secretion & turnover of vasopressin.

231 Pituitary bright spot is absent in patients with ?

Harrison's 18th Ed. 2906

- A. Pituitary diabetes insipidus
- B. Nephrogenic diabetes insipidus
- C. Empty sella who do not have diabetes insipidus
- D. All of the above

A normal pituitary bright spot on MRI excludes pituitary DI, is against nephrogenic DI and strongly suggests primary polydipsia. It is absent not only in pituitary and nephrogenic DI but also in some normal persons and in patients with empty sella who do not have DI.

232 Desmopressin (DDAVP) can be administered by ?

Harrison's 18th Ed. 2906

- A. SC injection
- B. Nasal inhalation

- C. Oral tablet
- D. All of the above

DDAVP is a synthetic analogue of AVP that can be given IV or SC, nasal inhalation or orally.

233 Nephrogenic DI is treated by ?

Harrison's 18th Ed. 2906

- A. Thiazide diuretic
- B. Indomethacin
- C. Amiloride
- D. All of the above

Nephrogenic DI does not respond to desmopressin but may be reduced with thiazide diuretic and/or amiloride with low-sodium diet. Inhibitors of prostaglandin synthesis (indomethacin) are effective.

234 Which of the following is false about adipsic hypernatremia ?

Harrison's 18th Ed. 2907

- A. Hypovolemia
- B. Hypokalemia
- C. Hyperuricemia
- D. None of the above

Adipsic hypernatremia is a state of chronic or recurrent hypertonic dehydration due to deficiency in osmoregulation of thirst. Hypernatremia is associated with hypovolemia presenting as tachycardia, postural hypotension, azotemia, hyperuricemia & hypokalemia. Muscle weakness, pain, rhabdomyolysis, hyperglycemia, hyperlipidemia & acute renal failure may also occur. DI is usually not present, at least at presentation.

235 Which of the following is false about adipsic hypernatremia ?

Harrison's 18th Ed. 2907

- A. Due to destruction of neurohypophysis
- B. Hypernatremic
- C. Hypertonic dehydration
- D. Develop hyponatremia if overhydrated

Adipsic hypernatremia is caused by agenesis or destruction of the hypothalamic osmoreceptors that normally regulate thirst & AVP secretion.

236 Most common electrolyte disorder in hospitalized patients is ?

N Engl J Med 2007;356:2064-72

- A. Hypokalemia
- B. Hyponatremia
- C. Hypocalcemia
- D. Hypomagnesemia

Hyponatremia, defined as an excess of water in relation to sodium in extra-cellular fluid, is the most common electrolyte disorder in hospitalized patients.

237 SIADH was first described in patients with ?

N Engl J Med 2007;356:2064-72

- A. Sepsis
- B. Head trauma
- C. Bronchogenic carcinoma
- D. Schizophrenia

SIADH was first described in patients with bronchogenic carcinoma in whom a physiologic stimulus for release of antidiuretic hormone was lacking and the level of secretion of ADH was deemed "inappropriate". After the syndrome was described, ADH in humans was found to be arginine vasopressin.

238 Which of the following is an AVP analogue ?

N Engl J Med 2007;356:2064-72

- A. Desmopressin
- B. Oxytocin

- C. Vasopressin
- D. All of the above

239 Water intoxication can lead to ?

Harrison's 18th Ed. 2908

- A. Headache
- B. Anorexia, nausea, vomiting
- C. Confusion, coma, convulsions
- D. All of the above

Severe hyponatremia (serum sodium <125 mmol per liter), especially when the condition develops rapidly (within 48 hours), has serious sequelae, including confusion, hallucinations, seizures, coma, decerebrate posture & respiratory arrest, leading to death.

240 Drug that stimulate release of AVP or enhance its action is ?

N Engl J Med 2007;356:2064-72

- A. Carbamazepine
- B. Nicotine
- C. Nonsteroidal antiinflammatory drugs
- D. All of the above

Drugs that stimulate release of AVP or enhance its action include Chlorpropamide, SSRIs, Tricyclic antidepressants, Clofibrate, Carbamazepine, Vincristine, Nicotine, Narcotics, Antipsychotic drugs, Ifosfamide, Cyclophosphamide, Nonsteroidal anti-inflammatory drugs, Ecstasy.

Chapter 341. Disorders of the Thyroid Gland

241 Word thyroid is derived from Greek word "thyreos" meaning ?

Harrison's 18th Ed. 2911

- A. Conical shaped
- B. Shield
- C. Superficial
- D. Essential

Word thyroid is derived from a Greek word thyreos meaning "shield" plus eidos meaning "form".

242 What is the normal weight of human throid gland ?

Harrison's 18th Ed. 2911

- A. 6 to 12 grams
- B. 12 to 20 grams
- C. 20 to 30 grams
- D. 30 to 50 grams

Normal thyroid is 12 - 20 grams in weight.

243 Thyroid hormone synthesis normally begins at what time of gestation ?

Harrison's 18th Ed. 2911

- A. About 6 weeks'
- B. About 11 weeks'
- C. About 16 weeks'
- D. About 21 weeks'

Thyroid hormone synthesis normally begins at about 11 weeks' gestation.

244 Density of C cells in thyroid gland is greatest at ?

Harrison's 18th Ed. 2911

- A. Junction of upper two-third & lower one-thirds
- B. Junction of upper one-third & lower two-thirds

- C. Junction of upper & lower halves
- D. At the poles

Density of C cells in thyroid gland is greatest at the junction of upper one-third & lower two-thirds. Thyroid medullary C cells are neural crest derivatives & produce a calcium-lowering hormone - calcitonin.

245 Which of the following is thyroid gland developmental transcription factor ?

Harrison's 18th Ed. 2912

- A. TTF-1 (NKX2A)
- B. TTF-2 (FKHL15)
- C. Paired homeobox-8 (PAX-8)
- D. All of the above

Thyroid gland development is orchestrated by coordinated expression of developmental transcription factors like Thyroid transcription factor (TTF) 1, TTF-2 & paired homeobox-8 (PAX-8).

246 Which of the following surface of thyroid follicular cells is in contact with bloodstream ?

Harrison's 18th Ed. 2912

- A. Apical
- B. Basolateral
- C. Basal
- D. Lateral

Basolateral surface of thyroid follicular cells is apposed to bloodstream and apical surface faces the follicular lumen.

247 TSH is secreted by the thyrotrope cells of ?

Harrison's 18th Ed. 2913

- A. Anterior pituitary
- B. Posterior pituitary
- C. Stalk of pituitary
- D. All of the above

TSH is secreted by the thyrotrope cells of the anterior pituitary gland.

248 Most useful physiologic marker of thyroid hormone action is ?

Harrison's 18th Ed. 2913

- A. T3
- B. T4
- C. TSH
- D. All of the above

TSH is the most useful physiologic marker of thyroid hormone action.

249 The size of thyroid-stimulating hormone (TSH) is ?

Harrison's 18th Ed. 2913

- A. 11-kDa
- B. 21-kDa
- C. 31-kDa
- D. 41-kDa

250 The α subunit of thyroid-stimulating hormone (TSH) is common to which of the following hormones ?

Harrison's 18th Ed. 2913

- A. Luteinizing hormone
- B. Follicle-stimulating hormone
- C. Human chorionic gonadotropin (hCG)
- D. All of the above

- 251 The β subunit of thyroid-stimulating hormone is common to which of the following hormones ?**

Harrison's 18th Ed. 2913

- A. Luteinizing hormone
- B. Follicle-stimulating hormone
- C. Human chorionic gonadotropin (hCG)
- D. None of the above

TSH is a 31-kDa hormone composed of alpha & beta subunits. Alpha subunit is common to other glycoprotein hormones like luteinizing hormone, follicle-stimulating hormone, human chorionic gonadotropin (hCG), whereas TSH beta subunit is unique to TSH.

- 252 The "set-point" in thyroid axis (endocrine feedback loop) is established by ?**

Harrison's 18th Ed. 2913

- A. TRH
- B. TSH
- C. T_3
- D. T_4

The "set-point" in thyroid axis is established by TSH.

- 253 On administration of exogenous TRH, after what time does peak TSH secretion occur ?**

Harrison's 18th Ed. 2913

- A. About 5 minutes
- B. About 10 minutes
- C. About 15 minutes
- D. About 20 minutes

Peak TSH secretion occurs ~15 minutes after administration of exogenous TRH.

- 254 Which of the following about TSH secretion is false ?**

Harrison's 18th Ed. 2913

- A. Released in pulsatile manner
- B. Exhibits diurnal rhythm
- C. Highest levels occur at night
- D. None of the above

TSH is released in a pulsatile manner & exhibits diurnal rhythm with highest levels occurring at night.

- 255 Plasma half-life of TSH is ?**

Harrison's 18th Ed. 2913

- A. 10 minutes
- B. 30 minutes
- C. 50 minutes
- D. 80 minutes

TSH has a relatively long plasma half-life of 50 minutes.

- 256 Single measurement of TSH is adequate for assessing its circulating level because of ?**

Harrison's 18th Ed. 2913

- A. No diurnal variation
- B. Relatively long plasma half-life
- C. Non pulsatile release
- D. Low protein binding

Single measurements of TSH are adequate for assessing its circulating level due to its relatively long plasma half-life.

- 257 T_4 & T_3 are formed from thyroglobulin by what mechanism ?**

Harrison's 18th Ed. 2913

- A. Coupling
- B. Proteolysis
- C. Iodination
- D. All of the above

Thyroid hormones are derived from a large iodinated glycoprotein thyroglobulin (Tg). After secretion into thyroid follicle, Tg is iodinated on tyrosine residues that are subsequently coupled via an ether linkage. Reuptake of Tg into thyroid follicular cell allows "proteolysis" & release of newly synthesized T_4 & T_3 .

- 258 Which of the following about ingested iodine is false ?**

Harrison's 18th Ed. 2913

- A. Bound to albumin
- B. Unbound iodine excreted in urine
- C. Iodide uptake is mediated by Na^+/I^- symporter (NIS)
- D. None of the above

Ingested iodine is bound to serum albumin. Unbound iodine is excreted in urine. Thyroid gland extracts iodine from circulation mediated by the Na^+/I^- symporter (NIS) which is expressed at the basolateral membrane of thyroid follicular cells.

- 259 Na^+/I^- symporter (NIS) is expressed in all of the following except ?**

Harrison's 18th Ed. 2913

- A. Thyroid gland
- B. Salivary glands
- C. Placenta
- D. Testicles

NIS is highly expressed in thyroid gland, but low levels are present in the salivary glands, lactating breast & placenta.

- 260 Iodine transporter - pendrin is located on which surface of thyroid cells ?**

Harrison's 18th Ed. 2913

- A. Apical
- B. Basolateral
- C. Basal
- D. Lateral

Iodine transporter, pendrin, is located on the apical surface of thyroid cells

- 261 Which of the following is false about 'Pendred syndrome' ?**

Harrison's 18th Ed. 2913

- A. Due to deficiency of iodine transporter - pendrin
- B. Due to mutation of PENDRIN gene
- C. Characterized by goiter & sensorineural deafness
- D. None of the above

Iodine transporter - pendrin mediates iodine efflux into the lumen. Mutation of PENDRIN gene causes Pendred syndrome characterized by defective organification of iodine, goiter & sensorineural deafness.

- 262 Iodine-deficiency data of WHO is based on ?**

Harrison's 18th Ed. 2913

- A. Urinary excretion of iodine
- B. Anthropometry
- C. Serum levels of thyroid hormones
- D. Symptoms & signs

Based on urinary excretion data, WHO estimates that ~ 2 billion people are iodine-deficient.

263 Concomitant deficiency of which element contributes to neurologic manifestations of cretinism ?

Harrison's 18th Ed. 2913

- A. Manganese
- B. Cobalt
- C. Selenium
- D. Copper

Concomitant selenium deficiency contributes to the neurologic manifestations of cretinism.

264 For adults, recommended average daily intake of iodine is ?

Harrison's 18th Ed. 2914

- A. 100 µg/day
- B. 150 µg/day
- C. 200 µg/day
- D. 250 µg/day

265 For pregnant women, recommended average daily intake of iodine is ?

Harrison's 18th Ed. 2914

- A. 100 µg/day
- B. 150 µg/day
- C. 200 µg/day
- D. 250 µg/day

The recommended average daily intake of iodine is 150 µg/day for adults, 90 - 120 µg/day for children, and 200 µg/day for pregnant women.

266 In iodine-sufficient populations, urinary iodine is level is ?

Harrison's 18th Ed. 2914

- A. > 2 µg/dL
- B. > 5 µg/dL
- C. > 8 µg/dL
- D. > 10 µg/dL

Urinary iodine is >10 µg/dL in iodine-sufficient populations.

267 Thyroglobulin releases T_4 & T_3 in which structure of thyroid cell ?

Harrison's 18th Ed. 2914

- A. Mitochondria
- B. Golgi apparatus
- C. Lysosome
- D. All of the above

After coupling, T_g is taken back into thyroid cell, where it is processed in "lysosomes" to release T_4 & T_3 .

268 Which of the following is false about thyroglobulin (Tg) ?

Harrison's 18th Ed. 2914

- A. 660 kDa size
- B. Dimeric protein
- C. Consists of 2769 amino acids
- D. None of the above

thyroglobulin (Tg) is a large (660 kDa) dimeric protein that consists of 2769 amino acids.

269 Congenital hypothyroidism is mostly due to mutations in ?

Harrison's 18th Ed. 2914

- A. TPO

- B. NIS
- C. Dehalogenase
- D. Pendrin

Majority of congenital hypothyroidism are due to recessive mutations in TPO or Tg. Defects have also been identified in TSH-R, NIS, pendrin, hydrogen peroxide generation, and dehalogenase.

270 Factors that influence thyroid hormone synthesis & release include all except ?

Harrison's 18th Ed. 2914

- A. Insulin-like growth factor I (IGF-I)
- B. Prolactin
- C. Epidermal growth factor
- D. Transforming growth factor β (TGF- β)

TSH is the dominant hormonal regulator of thyroid gland growth & function, but growth factors produced locally in thyroid gland also influence thyroid hormone synthesis which include insulin-like growth factor I (IGF-I), epidermal growth factor, transforming growth factor (TGF- β) & endothelins.

271 Wolff-Chaikoff effect is related to ?

Harrison's 18th Ed. 2914

- A. Iodine deficiency
- B. Excess iodide
- C. Developmental abnormality of thyroid
- D. All of the above

Excess iodide transiently inhibits thyroid iodide organification, a phenomenon known as the Wolff-Chaikoff effect. Normal thyroid gland escapes from this inhibitory effect & iodide organification resumes. In patients with underlying autoimmune thyroid disease, suppressive action of high iodide may persist.

272 T_3 & T_4 hormones circulate bound to which plasma protein ?

Harrison's 18th Ed. 2914

- A. Thyroxine-binding globulin (TBG)
- B. Transthyretin (TTR)
- C. Albumin
- D. All of the above

T_4 & T_3 are bound to plasma proteins which include thyroxine-binding globulin (TBG), transthyretin (TTR, formerly known as thyroxine-binding prealbumin, or TBPA) and albumin.

273 Function of serum-binding proteins is ?

Harrison's 18th Ed. 2914

- A. To increase pool of circulating hormone
- B. To delay hormone clearance
- C. To modulate hormone delivery
- D. All of the above

Plasma-binding proteins increase the pool of circulating hormone, delay hormone clearance, and may modulate hormone delivery to selected tissue sites.

274 Which of the following receptors mediate thyroglobulin (Tg) endocytosis by thyroid cells ?

Harrison's 17th Ed. 2227

- A. Cubilin
- B. Clathrin
- C. Megalin
- D. Adaptin

Megalin is a transmembrane glycoprotein that mediates endocytosis of Tg by thyroid cells resulting in its transcytosis, thereby avoiding the lysosomal pathway, where proteolytic cleavage of Tg results in hormone release. Transcytosis of Tg endocytosed from the colloid is thought to be one of the mechanisms that account for the presence of intact Tg in the circulation, where the levels have been shown to be increased under conditions with heightened TSH stimulation.

275 Megalin is also known as ?

- A. gp280
- B. gp310
- C. gp330
- D. gp360

Megalin was originally identified as the antigen in Heymann nephritis of rats. It was purified from rat kidney brush border & named gp330 on the basis of molecular weight as estimated by its mobility during gel electrophoresis.

276 Megalin belongs to which of the following ?

- A. LDL-receptor family
- B. Toll-like receptor family
- C. EGF receptor family
- D. Secretin receptor family

Megalin belongs to the LDL-receptor family, sharing common features with LDL receptor, LDL-receptor-related protein (LRP), very-low-density lipoprotein (VLDL) receptor, and the apolipoprotein E (apo E) receptor-2.

277 Homeostatic mechanisms regulating thyroid axis are directed toward maintenance of normal concentrations of ?

Harrison's 18th Ed. 2914

- A. Unbound T_3 and T_4
- B. Protein bound T_3 and T_4
- C. TSH
- D. TRH

Homeostatic mechanisms that regulate the thyroid axis are directed toward maintenance of normal concentrations of unbound hormones.

278 In X-linked Thyroxine-binding globulin (TBG) deficiency, patients are ?

Harrison's 18th Ed. 2915

- A. Hypothyroid
- B. Hyperthyroid
- C. Euthyroid
- D. Any of the above

X-linked TBG deficiency is associated with very low levels of total T_4 and T_3 . However, because unbound hormone levels are normal, patients are euthyroid and TSH levels are normal. Efforts to normalize total T_4 levels should be avoided, as it may lead to thyrotoxicosis.

279 Which of the following statements about familial dysalbuminemic hyperthyroxinemia (FDH) is false ?

Harrison's 18th Ed. 2915

- A. Due to mutations in albumin
- B. Autosomal dominant transmission
- C. Increased total T_4 &/or T_3 , but free hormone levels are normal
- D. TSH levels are decreased

Mutations in TBG, TTR, and albumin may increase the binding affinity for T_4 and/or T_3 and cause disorders known as euthyroid hyperthyroxinemia or familial dysalbuminemic hyperthyroxinemia (FDH). Total T_4 and/or T_3 are increased but unbound hormone levels are normal. Familial nature with normal TSH levels suggest this diagnosis. Unbound hormone levels (ideally measured by dialysis) are normal in FDH.

280 Acquired TBG excess occurs due to all except ?

Harrison's 18th Ed. 2915 Table 341-3

- A. Pregnancy
- B. CHF
- C. Cirrhosis

D. Hepatitis

Acquired TBG excess is seen with estrogen, pregnancy, cirrhosis & hepatitis.

281 Which of the following about deiodinases is false ?

Harrison's 18th Ed. 2915

- A. T_4 is converted to T_3 by deiodinase enzymes
- B. Type I deiodinase is located in thyroid, liver & kidney
- C. Type I deiodinase has a relatively low affinity for T_4
- D. None of the above

T_4 is converted to T_3 by deiodinase enzymes. Type I deiodinase, which is located primarily in thyroid, liver, and kidney, has a relatively low affinity for T_4 .

282 Which of the following about deiodinases is false ?

Harrison's 18th Ed. 2915

- A. Type II deiodinase is found in pituitary, brown fat, brain & thyroid
- B. Type II deiodinase has higher affinity for T_4
- C. Type III deiodinase inactivates T_4 & T_3
- D. None of the above

Type II deiodinase has a higher affinity for T_4 and is found primarily in the pituitary gland, brain, brown fat, and thyroid gland. Expression of type II deiodinase allows it to regulate T_3 concentrations locally. Type III deiodinase inactivates T_4 and T_3 .

283 Type I deiodinase is located in all except ?

Harrison's 18th Ed. 2915

- A. Thyroid
- B. Liver
- C. Prostate
- D. Kidney

Type I deiodinase is located primarily in thyroid, liver, and kidney.

284 Which of the following deiodinases is the most important source of reverse T_3 (rT_3) ?

Harrison's 18th Ed. 2915

- A. Type I deiodinase
- B. Type II deiodinase
- C. Type III deiodinase
- D. All of the above

Type III deiodinase inactivates T_4 and T_3 and is the most important source of reverse T_3 (rT_3). Massive hemangiomas that express type III deiodinase are a rare cause of hypothyroidism in infants.

285 T_4 to T_3 conversion may be impaired by ?

Harrison's 18th Ed. 2915

- A. Fasting
- B. Systemic illness
- C. Acute trauma
- D. All of the above

286 T_4 to T_3 conversion may be impaired by ?

Harrison's 18th Ed. 2915

- A. Oral contrast agents
- B. Amiodarone
- C. Glucocorticoids
- D. All of the above

T_4 to T_3 conversion is impaired by fasting, systemic illness or acute trauma, oral contrast agents, and medications like propylthiouracil, propranolol, amiodarone, glucocorticoids.

287 Which of the following is a thyroid hormone (TH) transporter ?

Harrison's 18th Ed. 2915

- A. MCT2
- B. MCT4
- C. MCT6
- D. MCT8

Circulating thyroid hormones enter cells by passive diffusion and via the monocarboxylate 8 (MCT8) transporter. Mutations in MCT8 cause neurologic deficits & thyroid function abnormalities (low T₄, high T₃, and high TSH).

288 Which of the following X-Linked Syndromes is related to mutation in MCT8 gene ?

Harrison's 18th Ed. 2915

- A. Gustavsson syndrome
- B. Brooks-Wisniewski-Brown syndrome
- C. Allan-Herndon-Dudley syndrome
- D. Schimke syndrome

Allan-Herndon-Dudley syndrome is an X-linked mental retardation condition caused by mutations in the monocarboxylate transporter 8 (MCT8) gene. Its features include moderate-severe mental retardation, impaired speech, hypotonia, muscle weakness, and contractures. Mutations in this gene, located at Xq13.2, impair transport of T₃ into neurons (elevated free T₃ & decreased free T₄ in blood).

289 Thyroid hormones act through ?

Harrison's 18th Ed. 2915

- A. Cell membrane hormone receptors
- B. Nuclear hormone receptors
- C. Mitochondrial hormone receptors
- D. All of the above

Thyroxine (T₄) and triiodothyronine (T₃) act through nuclear receptors.

290 Thyroid hormone receptor β (TR β) is more abundant than TR α in which of the following organs ?

Harrison's 18th Ed. 2915

- A. Brain
- B. Kidney
- C. Gonads
- D. Pituitary

291 Thyroid hormone receptor β (TR β) is more abundant than TR α in which of the following organs ?

Harrison's 18th Ed. 2915

- A. Muscle
- B. Kidney
- C. Liver
- D. Heart

Thyroid hormones bind with high affinity to nuclear thyroid hormone receptors (TR) alpha & beta - expressed in most tissues. TR-alpha is particularly abundant in brain, kidney, gonads, muscle, and heart, whereas TR - beta expression is relatively high in the pituitary and liver.

292 Which of the following plays a role in feedback control of the thyroid axis in hypothalamus and pituitary ?

Harrison's 18th Ed. 2915

- A. TR α 1
- B. TR β 1
- C. TR α 2
- D. TR β 2

The TR-beta2 isoform, which has a unique amino terminus, is selectively expressed in the hypothalamus and pituitary, where it plays a role in feedback control of the thyroid axis.

293 Which of the following prevents thyroid hormone binding ?

Harrison's 18th Ed. 2916

- A. TR α 1
- B. TR β 1
- C. TR α 2
- D. TR β 2

TR - α 2 isoform contains a unique carboxy terminus that precludes thyroid hormone binding.

294 Thyroid hormone receptor (TR) binds to which of the following in the promoter region of target genes ?

Harrison's 18th Ed. 2916

- A. Thyroid hormone recruiting elements
- B. Thyroid hormone receptor elements
- C. Thyroid hormone response elements
- D. Thyroid hormone reacting elements

In nucleus, thyroid hormone receptor (TR) & retinoid X receptor (RXR) form heterodimers that bind specifically to thyroid hormone response elements (TRE) in promoter regions of target genes.

295 Serum T₄ has a plasma half-life of ?

Harrison's 18th Ed. 2914 Table 341-2

- A. 1 day
- B. 3 days
- C. 7 days
- D. 10 days

296 Serum T₃ has a plasma half-life of about ?

Harrison's 18th Ed. 2914 Table 341-2

- A. 1 day
- B. 3 days
- C. 7 days
- D. 10 days

297 What fraction of circulating T₃ comes directly from thyroid gland ?

Harrison's 18th Ed. 2914 Table 341-2

- A. 10 %
- B. 20 %
- C. 30 %
- D. 40 %

298 What fraction of circulating T₄ comes directly from thyroid gland ?

Harrison's 18th Ed. 2914 Table 341-2

- A. 25 %
- B. 50 %
- C. 75 %
- D. 100 %

299 Normally, secretion ratio from thyroid gland of T₃ & T₄ is ?

Harrison's 17th Ed. 2229

- A. 1 : 10
- B. 1 : 20
- C. 1 : 30
- D. 1 : 40

300 Which of the following statements about resistance to thyroid hormone (RTH) is false ?

Harrison's 18th Ed. 2916

- A. Autosomal dominant disorder
- B. Due to mutation in TR β receptor gene
- C. Elevated free thyroid hormone levels
- D. Presents as hypothyroidism

Resistance to thyroid hormone (RTH) is an autosomal dominant disorder characterized by elevated thyroid hormone levels & inappropriately normal or elevated TSH. Individuals with RTH do not exhibit signs & symptoms of hypothyroidism because hormone resistance is partial and is compensated by increased levels of thyroid hormone. RTH is caused by mutations in the R receptor gene.

301 Which of the following statements about resistance to thyroid hormone (RTH) is false ?

Harrison's 18th Ed. 2916

- A. Goiter
- B. Tachycardia
- C. Impaired metabolic responses to thyroid hormone
- D. Treated with thyroid replacement drugs

Clinical features of RTH include goiter, attention deficit disorder, mild reduction in IQ, delayed skeletal maturation, tachycardia & impaired metabolic responses to thyroid hormone. Mostly no treatment is indicated, rather inappropriate treatment of mistaken hyperthyroidism should be avoided.

302 Pemberton's sign is elicited by ?

Harrison's 17th Ed. 2228

- A. Act of swallowing
- B. Raising of arms
- C. Extrusion of tongue
- D. All of the above

Large retrosternal goiters can cause venous distention over the neck and difficulty breathing, especially when the arms are raised (Pemberton's sign). With any central mass above the thyroid, the tongue should be extended, as thyroglossal cysts then move upward.

303 Free T3 index is calculated by ?

Harrison's 17th Ed. 2229

- A. Thyroid hormone binding ratio (THBR) x Total T₃
- B. Thyroid hormone binding ratio (THBR) / Total T₃
- C. Thyroid hormone binding ratio (THBR) x Free T₃
- D. Thyroid hormone binding ratio (THBR) / Free T₃

The product of THBR and total T₃ or T₄ provides the free T₃ or T₄ index. In effect, the index corrects for anomalous total hormone values caused by abnormalities in hormone-protein binding.

304 TBG is increased due to all except ?

Harrison's 18th Ed. 2917

- A. Pregnancy
- B. Hormone replacement therapy
- C. Nephrotic syndrome
- D. Tamoxifen

Total thyroid hormone levels are elevated when TBG is increased due to estrogens (pregnancy, oral contraceptives, hormone therapy, tamoxifen). TBG is reduced by androgens & in nephrotic syndrome.

305 In pregnancy, circulating free T₄, free T₃ and TSH are ?

Harrison's 16th Ed. 35

- A. Normal
- B. Increased
- C. Decreased
- D. Any of the above

306 TSH levels are elevated in all except ?

Harrison's 18th Ed. 2917

- A. Hypothyroidism
- B. Thyroid hormone resistance
- C. First trimester of pregnancy
- D. TSH-secreting pituitary tumor

307 TSH levels are suppressed in ?

Harrison's 18th Ed. 2917

- A. Thyrotoxicosis
- B. First trimester of pregnancy
- C. Insulin
- D. Dopamine

Elevated TSH levels occur in hypothyroidism most commonly, and also in TSH-secreting pituitary tumor, thyroid hormone resistance & assay artifact. Suppressed TSH level (<0.1 mU/L) indicates thyrotoxicosis but are also seen during first trimester of pregnancy (due to hCG secretion), after treatment of hyperthyroidism & in response to high doses of glucocorticoids or dopamine.

308 Which of the following radioisotopes of iodine is used for thyroid imaging ?

Harrison's 18th Ed. 2917

- A. ¹²³I
- B. ¹²⁵I
- C. ¹³¹I
- D. All of the above

Thyroid gland selectively transports radioisotopes of iodine (¹²³I, ¹²⁵I, ¹³¹I) and ^{99m}Tc pertechnetate, allowing thyroid imaging & quantitation of radioactive tracer fractional uptake.

309 What frequency of transducer is best for thyroid ultrasonography ?

Harrison's 18th Ed. 2918

- A. 2.5 MHz
- B. 5 MHz
- C. 7.5 MHz
- D. 10 MHz

A 10-MHz ultrasound probe can detect thyroid nodules and cysts >3 mm.

310 Neonatal hypothyroidism is most frequently due to ?

Harrison's 18th Ed. 2918

- A. Thyroid gland dysgenesis
- B. Inborn errors of thyroid hormone synthesis
- C. TSH-R antibody-mediated
- D. Idiopathic

Neonatal hypothyroidism is due to thyroid gland dysgenesis in 80 - 85%, to inborn errors of thyroid hormone synthesis in 10 - 15% & is TSH-R antibody-mediated in 5% of affected newborns.

311 Which of the following is the most common symptom of hypothyroidism ?

Harrison's 18th Ed. 2918 Table 341-5

- A. Dry skin
- B. Hair loss
- C. Constipation
- D. Weight gain with poor appetite

312 Which of the following is the most common sign of hypothyroidism ?

Harrison's 18th Ed. 2918 Table 341-5

- A. Bradycardia

- B. Diffuse alopecia
- C. Dry coarse skin
- D. Peripheral oedema

313 Symptoms of hypothyroidism become more readily apparent at TSH levels of ?

Harrison's 18th Ed. 2918

- A. > 7 mU/L
- B. > 8 mU/L
- C. > 9 mU/L
- D. > 10 mU/L

Symptoms of hypothyroidism become more readily apparent at when TSH is >10 mU/L.

314 Which of the following is false about Hashimoto's thyroiditis ?

Harrison's 18th Ed. 2918

- A. Lymphocytic infiltration
- B. Atrophy of thyroid follicles
- C. No fibrosis
- D. May progress to atrophic thyroiditis

In Hashimoto's thyroiditis, there is a marked lymphocytic infiltration of thyroid with germinal center formation, atrophy of thyroid follicles accompanied by oxyphil metaplasia, absence of colloid & mild to moderate fibrosis.

315 Lymphocytic infiltrate in autoimmune hypothyroidism is composed of ?

Harrison's 18th Ed. 2919

- A. Activated CD4+ T cells
- B. Activated CD8+ T cells
- C. B cells
- D. All of the above

Thyroid lymphocytic infiltrate in autoimmune hypothyroidism is composed of activated CD4+, CD8+ T cells and B cells. Thyroid cell destruction is primarily mediated by CD8+ cytotoxic T cells.

316 Which of the following is false about Hashimoto's encephalopathy ?

Harrison's 18th Ed. 2919

- A. Grand Mal seizure
- B. Slow-wave activity on EEG
- C. Steroid-responsive
- D. May occur in autoimmune thyroiditis without hypothyroidism

Hashimoto's encephalopathy is a steroid-responsive syndrome associated with TPO antibodies, myoclonus & slow-wave activity on EEG.

317 Daily replacement dose of levothyroxine is usually ?

Harrison's 18th Ed. 2921

- A. 1.6 µg/kg body weight
- B. 1.8 µg/kg body weight
- C. 2.0 µg/kg body weight
- D. 2.2 µg/kg body weight

If there is no residual thyroid function, daily replacement dose of levothyroxine is usually 1.6 µg/kg body weight (typically 100 - 150 µg).

318 TSH responses should be measured after what time upon levothyroxine treatment ?

Harrison's 18th Ed. 2921

- A. 7 days
- B. 15 days
- C. 1 month
- D. 2 months

TSH responses to levothyroxine therapy are gradual & should be measured ~ 2 months after instituting treatment.

319 If TSH is high, levothyroxine dosage should be increased by ?

Harrison's 18th Ed. 2921

- A. 6.25 - 12.5 µg increments
- B. 12.5 - 25 µg increments
- C. 25 - 75 µg increments
- D. 75 - 100 µg increments

Adjustment of levothyroxine dosage is made in 12.5 or 25 µg increments if the TSH is high.

320 Upon normalization of TSH levels, patients experience full relief from symptoms after ?

Harrison's 18th Ed. 2921

- A. 15 days to 2 months
- B. 2 to 3 months
- C. 3 to 6 months
- D. 6 months to 1 year

Patients experience full relief from symptoms 3 - 6 months after normal TSH levels are restored.

321 Which of the following treatments is least recommended in hypothyroidism ?

Harrison's 18th Ed. 2921

- A. T₄ alone
- B. T₃ alone
- C. T₃ & T₄ combined
- D. T₃ & T₄ alternately

There is no place for liothyronine alone as long-term replacement due to its short half-life which necessitates multiple dosage per day and is associated with fluctuating T₃ levels.

322 In patients taking Levothyroxine (> 200 µg/day) with elevated TSH level suggests the possibility of ?

Harrison's 18th Ed. 2921

- A. Poor compliance
- B. Inappropriate TSH secretion
- C. Malabsorption
- D. Any of the above

323 Drugs that interfere with T₄ absorption / clearance are all except ?

Harrison's 18th Ed. 2921

- A. Cholestyramine
- B. Ferrous sulfate
- C. Calcium supplements
- D. Isoniazid

324 Drugs that interfere with T₄ absorption / clearance are all except ?

Harrison's 18th Ed. 2921

- A. Lovastatin
- B. Aluminum hydroxide
- C. Cimetidine
- D. Rifampicin

325 Drugs that interfere with T_4 absorption / clearance are all except ?

Harrison's 18th Ed. 2921

- A. Lidocaine
- B. Amiodarone
- C. Carbamazepine
- D. Phenytoin

Causes of increased levothyroxine requirements are malabsorption (celiac disease, small-bowel surgery), estrogen therapy & drugs that interfere with T_4 absorption or clearance like cholestyramine, ferrous sulfate, calcium supplements, lovastatin, aluminum hydroxide, rifampicin, amiodarone, carbamazepine & phenytoin.

326 During pregnancy, dose of levothyroxine may need to be ?

Harrison's 18th Ed. 2922

- A. Increased
- B. Decreased
- C. Stopped
- D. All of the above

The dose of levothyroxine may need to be increased by $\geq 50\%$ during pregnancy and returned to previous levels after delivery.

327 Thyroxine doses in elderly patients should be less than younger patients by ?

Harrison's 18th Ed. 2922

- A. 10 %
- B. 20 %
- C. 30 %
- D. 50 %

328 In elderly patients with CAD, the starting dose of levothyroxine is ?

Harrison's 18th Ed. 2922

- A. 12.5 to 25 $\mu\text{g/day}$
- B. 25 to 37.5 $\mu\text{g/day}$
- C. 37.5 to 50 $\mu\text{g/day}$
- D. 50 to 62.5 $\mu\text{g/day}$

Elderly patients may require up to 20% less thyroxine than younger patients. In elderly with coronary artery disease, starting dose of levothyroxine is 12.5 - 25 $\mu\text{g/day}$ with similar increments every 2 - 3 months until TSH is normalized.

329 Myxedema coma almost always occurs in ?

Harrison's 18th Ed. 2922

- A. Neonates
- B. Adolescents
- C. Adults
- D. Elderly

330 Myxedema coma is precipitated by ?

Harrison's 18th Ed. 2922

- A. Sedatives
- B. Anesthetics
- C. Antidepressants
- D. All of the above

Myxedema coma almost always occurs in the elderly & is usually precipitated by factors that impair respiration, such as drugs (sedatives, anesthetics, antidepressants), pneumonia, CHF, MI, GI bleeding, Sepsis or CVAs. Exposure to cold, hypoventilation, hypoglycemia & dilutional hyponatremia also contribute to the development of myxedema coma.

331 Initial dose of levothyroxine in myxedema coma given by nasogastric tube is ?

Harrison's 18th Ed. 2922

- A. 200 μg
- B. 300 μg
- C. 400 μg
- D. 500 μg

In myxedema coma, 500 μg of Levothyroxine can be given either as intravenous bolus or by nasogastric tube.

332 Which of the following is not indicated while treating myxedema coma ?

Harrison's 18th Ed. 2922

- A. External warming
- B. Parenteral hydrocortisone
- C. Broad-spectrum antibiotics
- D. Hypotonic intravenous fluids

In myxedema coma, hypotonic intravenous fluids should be avoided as they may exacerbate water retention secondary to reduced renal perfusion & inappropriate vasopressin secretion. Metabolism of most medications is impaired so reduced doses are recommended.

333 TSI are synthesized in all except ?

Harrison's 18th Ed. 2923

- A. Thyroid gland
- B. Spleen
- C. Bone marrow
- D. Lymph nodes

Hyperthyroidism of Graves' disease is caused by thyroid-stimulating immunoglobulins (TSI) that are synthesized in the thyroid gland as well as in bone marrow & lymph nodes.

334 Which of the following is the most common symptom of hyperthyroidism ?

Harrison's 18th Ed. 2923 Table 341-7

- A. Palpitation
- B. Heat intolerance and sweating
- C. Weight loss and increased appetite
- D. Diarrhoea

335 Which of the following is the most common sign of hyperthyroidism ?

Harrison's 18th Ed. 2923 Table 341-7

- A. Tremor
- B. Warm, moist skin
- C. Tachycardia
- D. Lid retraction or lag

336 In hyperthyroidism, von Graefe's sign refers to ?

- A. Lagging of upper eye lid on looking downward
- B. Retracted lids causing wide palpebral opening
- C. Diminished frequency of blinking
- D. Inability to maintain convergence for close vision

337 In hyperthyroidism, Stellwag's sign refers to ?

- A. Lagging of upper eye lid on looking downward
- B. Retracted lids causing wide palpebral opening
- C. Diminished frequency of blinking
- D. Inability to maintain convergence for close vision

- 338 In hyperthyroidism, Dalrymple's sign refers to ?
 A. Lagging of upper eye lid on looking downward
 B. Retracted lids causing wide palpebral opening
 C. Diminished frequency of blinking
 D. Inability to maintain convergence for close vision
- 339 In hyperthyroidism, Moebius' sign refers to ?
 A. Lagging of upper eye lid on looking downward
 B. Retracted lids causing wide palpebral opening
 C. Diminished frequency of blinking
 D. Inability to maintain convergence for close vision
- 340 In hyperthyroidism, Abadie's sign refers to ?
 A. Involuntary twitching or spasm of LPS muscle
 B. Retracted lids causing wide palpebral opening
 C. Diminished frequency of blinking
 D. Inability to maintain convergence for close vision
- 341 Which of the following is not a cause of "thyrotoxicosis without hyperthyroidism" ?
Harrison's 17th Ed. 2233 Table 335-6
 A. Subacute thyroiditis
 B. Silent thyroiditis
 C. Toxic adenoma
 D. Thyrotoxicosis factitia
- 342 Which of the following is not a cause of primary hyperthyroidism ?
Harrison's 17th Ed. 2233 Table 335-6
 A. Toxic multinodular goiter
 B. Toxic adenoma
 C. Subacute thyroiditis
 D. Functioning thyroid carcinoma metastases
- 343 Titration of doses of anti-thyroid drugs is best based on ?
Harrison's 18th Ed. 2925
 A. Unbound T_3 levels
 B. Unbound T_4 levels
 C. TSH
 D. Any of the above

In hyperthyroidism, thyroid function tests & clinical manifestations are reviewed 3 - 4 weeks after starting treatment & the dose is titrated based on unbound T_4 levels.

- 344 Agranulocytosis due to anti-thyroid drugs is ?
Harrison's 18th Ed. 2926
 A. Idiosyncratic
 B. Dose related
 C. Duration related
 D. All of the above

When using antithyroid drugs, it is not useful to monitor blood counts prospectively, as the onset of agranulocytosis is idiosyncratic and abrupt.

- 345 In atrial fibrillation due to thyrotoxicosis, dose of digoxin is ?
Harrison's 18th Ed. 2926
 A. More
 B. Less
 C. Same

- D. Any of the above

In atrial fibrillation due to thyrotoxicosis, increased doses of digoxin are needed.

- 346 To avoid thyrotoxic crisis after radioiodine therapy, pretreatment with antithyroid drugs should be done for at least ?
Harrison's 18th Ed. 2926
 A. 7 days
 B. 14 days
 C. 21 days
 D. 1 month

Risk of thyrotoxic crisis after radioiodine therapy can be minimized by pretreatment with antithyroid drugs for at least a month before treatment.

- 347 Antithyroid drugs must be stopped how many days before administration of radioiodine ?
Harrison's 18th Ed. 2926
 A. At least 1 day
 B. At least 2 days
 C. At least 3 days
 D. At least 7 days

Carbimazole or methimazole must be stopped at least 2 days before radioiodine administration to achieve optimum iodine uptake. Propylthiouracil has a prolonged radioprotective effect & is stopped several weeks before radioiodine is given, or a larger dose of radioiodine will be necessary.

- 348 Radioactive ^{131}I dose used for thyrotoxicosis is ?
Harrison's 18th Ed. 2926
 A. 5 mCi - 15 mCi
 B. 15 mCi - 25 mCi
 C. 25 mCi - 35 mCi
 D. 35 mCi - 45 mCi

^{131}I dosage generally ranges between 185 MBq (5 mCi) to 555 MBq (15 mCi).

- 349 Hyperthyroidism can persist for how long before radioiodine takes full effect ?
Harrison's 18th Ed. 2926
 A. 1 to 2 months
 B. 2 to 3 months
 C. 3 to 4 months
 D. 4 to 5 months

Hyperthyroidism can persist for 2 - 3 months before radioiodine takes full effect.

- 350 Usually, second dose of radioiodine can be given after what duration in persistent hyperthyroidism ?
Harrison's 18th Ed. 2926
 A. 1 month
 B. 3 months
 C. 6 months
 D. 9 months

Persistent hyperthyroidism is treated with a 2nd dose of radioiodine, ~6 months after first dose.

- 351 Women can conceive safely how many months after radioiodine treatment ?
Harrison's 18th Ed. 2926
 A. 1 month
 B. 3 months

- C. 6 months
- D. 9 months

While pregnancy & breast feeding are absolute contraindications to radioiodine treatment, patients can conceive safely 6 months after treatment.

352 Which anti-thyroid drug is preferred in pregnancy with Graves' disease ?

Harrison's 18th Ed. 2926

- A. Propylthiouracil
- B. Carbimazole
- C. Methimazole
- D. Any of the above

Propylthiouracil is titrated to lowest effective dose to manage Graves' disease in pregnancy because of relatively low transplacental transfer and its ability to block T_4 to T_3 conversion. Carbimazole & methimazole rarely cause fetal aplasia cutis and choanal atresia.

353 Hyperthyroidism is most difficult to control in which trimester of pregnancy ?

Harrison's 16th Ed. 35

- A. First
- B. Second
- C. Third
- D. All of the above

354 Which of the following is not a cause of chronic thyroiditis ?

Harrison's 18th Ed. 2928 Table 341-8

- A. Riedel's thyroiditis
- B. Hashimoto's thyroiditis
- C. Radiation thyroiditis after ^{131}I treatment
- D. Parasitic thyroiditis (Echinococcosis)

355 Which of the following can cause acute, subacute or chronic thyroiditis ?

Harrison's 18th Ed. 2928 Table 341-8

- A. ^{131}I treatment
- B. Amiodarone
- C. Mycobacterial infection
- D. Riedel's thyroiditis

356 de Quervain's thyroiditis is a type of ?

Harrison's 18th Ed. 2928

- A. Acute thyroiditis
- B. Subacute thyroiditis
- C. Chronic thyroiditis
- D. Any of the above

Subacute Thyroiditis is also termed de Quervain's thyroiditis, granulomatous thyroiditis, or viral thyroiditis.

357 Which of the following is false about subacute thyroiditis ?

Harrison's 18th Ed. 2928

- A. High ESR
- B. Low radioiodine uptake
- C. Raised serum IL-6 levels
- D. Thyroid antibodies present

In subacute thyroiditis, diagnosis is confirmed by a high ESR, low radioiodine uptake and thyroid antibodies are negative.

358 Postpartum thyroiditis occurs how many months after pregnancy ?

Harrison's 18th Ed. 2929

- A. 1 to 3 months
- B. 3 to 6 months
- C. 6 to 9 months
- D. Any of the above

Postpartum thyroiditis occurs 3 - 6 months after pregnancy.

359 Which of the following is false about silent thyroiditis ?

Harrison's 18th Ed. 2929

- A. High ESR
- B. Low radioiodine uptake
- C. No thyroid tenderness
- D. Presence of TPO antibodies

Silent thyroiditis features a painless goiter, normal ESR and presence of TPO antibodies.

360 Which of the following can cause thyroiditis ?

Harrison's 18th Ed. 2929

- A. IFN- α
- B. IL-2
- C. Amiodarone
- D. All of the above

Patients receiving IFN- α , IL-2 or amiodarone may develop painless thyroiditis.

361 Which of the following is false about Riedel's thyroiditis ?

Harrison's 18th Ed. 2929

- A. Painless goiter
- B. Dense fibrosis of thyroid
- C. Thyroid dysfunction common
- D. Tamoxifen therapy beneficial

Riedel's thyroiditis is seen in middle-aged women. Presents insidiously as painless goiter with local symptoms due to compression of esophagus, trachea, neck veins or recurrent laryngeal nerves. Dense fibrosis disrupts normal gland architecture that can extend outside thyroid capsule. Despite extensive histologic changes, thyroid dysfunction is uncommon. Tamoxifen may be beneficial.

362 Riedel's thyroiditis is associated with fibrosis of ?

Harrison's 18th Ed. 2929

- A. Retroperitoneum
- B. Mediastinum
- C. Lung
- D. All of the above

Riedel's thyroiditis is associated with idiopathic fibrosis in retroperitoneum, mediastinum, biliary tree, lung, and orbit.

363 Which of the following is false about sick euthyroid syndrome ?

Harrison's 18th Ed. 2929

- A. Decreased total & unbound T_3 levels
- B. Normal T_4 levels
- C. Normal TSH levels
- D. None of the above

In sick euthyroid syndrome (SES), there is a decrease in total & unbound T_3 levels (low T_3 syndrome) with normal levels of T_4 and TSH.

364 Which of the following is increased in sick euthyroid syndrome ?

Harrison's 18th Ed. 2929

- A. Total T_3 levels
- B. Unbound T_3 levels
- C. Reverse T_3 levels
- D. TSH levels

T_4 conversion to T_3 via peripheral deiodination is impaired, leading to increased reverse T_3 (rT_3).

365 Amiodarone contains which of the following elements ?

Harrison's 18th Ed. 2930

- A. Zinc
- B. Iodine
- C. Calcium
- D. Iron

Amiodarone is structurally related to thyroid hormone & contains 39% iodine by weight.

366 During pregnancy, thyroid hormone requirements are ?

Harrison's 18th Ed. 2930

- A. Increased
- B. Decreased
- C. Same
- D. Any of the above

367 During pregnancy, urinary iodide excretion is ?

Harrison's 18th Ed. 2930

- A. Increased
- B. Decreased
- C. Same
- D. Any of the above

368 Which of the following is an environmental goitrogen ?

Harrison's 18th Ed. 2931

- A. Cassava root
- B. Cabbage
- C. Cauliflower
- D. All of the above

369 Chemodectomas are derived from ?

Harrison's 16th Ed. 2148

- A. Adrenal medulla
- B. Carotid body
- C. Postganglionic sympathetic neurons
- D. All of the above

Chapter 342. Disorders of the Adrenal Cortex

370 Corticosteroid hormone produced by adrenal cortex is ?

Harrison's 18th Ed. 2940

- A. Glucocorticoids
- B. Mineralocorticoids
- C. Adrenal androgens

D. All of the above

Corticosteroid hormones produced by adrenal cortex are glucocorticoids, mineralocorticoids & adrenal androgens.

371 Which of the following is produced by adrenal cortex ?

Harrison's 18th Ed. 2940

- A. Dehydroepiandrosterone
- B. Aldosterone
- C. Cortisol
- D. All of the above

372 Each normal adrenal gland weighs ?

Harrison's 18th Ed. 2941

- A. 2 - 6 gram
- B. 6 - 11 gram
- C. 11 - 18 gram
- D. 18 - 31 gram

Each normal adrenal gland weighs 6 - 11 gram.

373 Which of the following is located outermost in adrenal gland ?

Harrison's 18th Ed. 2941

- A. Zona glomerulosa
- B. Zona fasciculata
- C. Zona reticularis
- D. Adrenal medulla

Adrenal glands are located above the kidneys and have their own blood supply. Arterial blood supply is from outside to inside. Initially to subcapsular region, then to outer cortical zona glomerulosa, then to intermediate zona fasciculata, then to inner zona reticularis and eventually to adrenal medulla.

374 Which of the following about adrenal glands is false ?

Harrison's 18th Ed. 2941

- A. Adrenals originate from urogenital ridge
- B. Sexual differentiation occurs at 7th - 9th week of gestation
- C. Left suprarenal vein drains into vena cava
- D. SF1 and DAX1 are nuclear receptors

Right suprarenal vein drains directly into vena cava while left drains into left renal vein.

375 Size of polypeptide pro opiomelanocortin (POMC) is ?

Harrison's 18th Ed. 2941

- A. 141 amino acid
- B. 241 amino acid
- C. 341 amino acid
- D. 441 amino acid

Corticotropin-releasing hormone (CRH) stimulates cleavage of 241-amino acid polypeptide pro opiomelanocortin (POMC) by pituitary-specific prohormone convertase to produce adrenocorticotrophic hormone (ACTH).

376 Size of ACTH peptide is ?

Harrison's 18th Ed. 2941

- A. 21 amino acid
- B. 39 amino acid
- C. 76 amino acid
- D. 98 amino acid

ACTH peptide contains 39 amino acids but first 24 are sufficient to elicit a physiologic response.

377 A normal response in standard ACTH stimulation test is defined as a cortisol level of ?

Harrison's 18th Ed. 2941

- A. > 5 µg / dL
- B. > 10 µg / dL
- C. > 15 µg / dL
- D. > 20 µg / dL

The standard ACTH stimulation test involves administration of cosyntropin (ACTH 1-24), 0.25 mg IM or IV, and collection of blood samples at 0, 30, and 60 minutes for cortisol. A normal response is defined as a cortisol level > 20 µg/dL or an increment of >10 µg/dL over baseline.

378 MC2R (melanocortin 2 receptor) interacts with which of the following to bind ACTH ?

Harrison's 18th Ed. 2942

- A. MRAP
- B. MRBP
- C. MRCP
- D. MRDP

ACTH stimulation is required for initiation of steroidogenesis. ACTH receptor MC2R (melanocortin 2 receptor) interacts with MC2R-accessory protein (MRAP) and this complex at adrenocortical cell membrane binds to ACTH.

379 PKA activation affects steroidogenesis through ?

Harrison's 18th Ed. 2942

- A. Increase in import of cholesterol esters
- B. Breaks cholesterol esters to cholesterol
- C. Increases availability & phosphorylation of CREB
- D. All of the above

ACTH stimulation generates cyclic AMP (cAMP) which then upregulates protein kinase A (PKA) signaling pathway. PKA activation increases import of cholesterol esters, increases activity of hormone-sensitive lipase, which cleaves cholesterol esters to cholesterol for import into mitochondrion and increases availability & phosphorylation of CREB (cAMP response element binding), a transcription factor that enhances transcription of CYP11A1 and other enzymes required for glucocorticoid synthesis.

380 Which of the following statements is false ?

Harrison's 18th Ed. 2942

- A. Mineralocorticoid synthesis occurs in zona glomerulosa
- B. Glucocorticoid synthesis occurs in zona fasciculata
- C. Adrenal androgen synthesis occurs in zona reticularis
- D. None of the above

Adrenal steroidogenesis occurs in a zone-specific manner. Mineralocorticoid synthesis occurs in outer zona glomerulosa, glucocorticoid synthesis in zona fasciculata, and adrenal androgen synthesis in inner zona reticularis.

381 Cholesterol import into mitochondrion is initiated by the action of ?

Harrison's 18th Ed. 2942

- A. Phosphorylation of CREB
- B. Steroidogenic acute regulatory (StAR) protein
- C. CYP11A1
- D. All of the above

All steroidogenic pathways require cholesterol import into the mitochondrion, a process initiated by the action of steroidogenic acute regulatory (StAR) protein, which moves cholesterol from outer to inner mitochondrial membrane. CREB acts in the nucleus and makes available CYP11A1 which traverses to the mitochondria.

382 Which of the following enzyme converts pregnenolone to progesterone ?

Harrison's 18th Ed. 2940 Figure 342-1

- A. 17α-hydroxylase/17,20-lyase (CYP17A1)
- B. 21-hydroxylase (CYP21A2)
- C. 11β-hydroxylase (CYP11B1)
- D. 3β-HSD2

383 Which of the following enzyme converts progesterone to 17-hydroxyprogesterone ?

Harrison's 18th Ed. 2940 Figure 342-1

- A. 17α-hydroxylase/17,20-lyase (CYP17A1)
- B. 21-hydroxylase (CYP21A2)
- C. 11β-hydroxylase (CYP11B1)
- D. 3β-HSD2

384 Which of the following enzyme converts 17-hydroxyprogesterone to 11-deoxycortisol ?

Harrison's 18th Ed. 2940 Figure 342-1

- A. 17α-hydroxylase/17,20-lyase (CYP17A1)
- B. 21-hydroxylase (CYP21A2)
- C. 11β-hydroxylase (CYP11B1)
- D. 3β-HSD2

385 Which of the following enzyme converts 17-hydroxyprogesterone to androstenedione ?

Harrison's 18th Ed. 2940 Figure 342-1

- A. 17α-hydroxylase/17,20-lyase (CYP17A1)
- B. 21-hydroxylase (CYP21A2)
- C. 11β-hydroxylase (CYP11B1)
- D. 3β-HSD2

386 Which of the following enzyme converts 11-deoxycortisol to cortisol ?

Harrison's 18th Ed. 2940 Figure 342-1

- A. 17α-hydroxylase/17,20-lyase (CYP17A1)
- B. 21-hydroxylase (CYP21A2)
- C. 11β-hydroxylase (CYP11B1)
- D. 3β-HSD2

387 Action of mineralocorticoids include all except ?

Harrison's 18th Ed. 2940

- A. Immune responses
- B. Blood pressure
- C. Vascular volume
- D. Electrolytes

Glucocorticoids modulate intermediary metabolism & immune responses. Mineralocorticoids maintain blood pressure, vascular volume & electrolytes and androgens address secondary sexual characteristics (in females).

388 Basic structure of steroids is built upon a nucleus with how many rings ?

- A. Three-rings
- B. Four-rings
- C. Five-rings
- D. Six-rings

Basic structure of steroids is built upon a five-ring nucleus.

389 Number of carbon atoms in 17-hydroxycorticosteroids is ?

Harrison's 17th Ed. 2248

- A. 17
- B. 18
- C. 19
- D. 21

Adrenal steroids contain either 19 or 21 carbon atoms. C₂₁ steroids with a hydroxyl group at position 17 are termed 17-hydroxycorticosteroids.

390 Number of carbon atoms in 17-ketosteroids is ?
Harrison's 17th Ed. 2248

- A. 17
- B. 18
- C. 19
- D. 20

C₁₉ steroids have methyl groups at C-18 & C-19. C₁₉ steroids with a ketone group at C-17 are termed 17-ketosteroids.

391 C₁₉ steroids have predominantly ?
Harrison's 17th Ed. 2248

- A. Androgenic properties
- B. Glucocorticoid properties
- C. Mineralcorticoid properties
- D. All of the above

C₁₉ steroids have predominantly androgenic activity.

392 Cyclopentenoperhydrophenanthrene nucleus is a constituent of ?
Harrison's 15th Ed. Chapter 331

- A. Steroids
- B. Insulin
- C. Pepsin
- D. Growth hormone

393 Basic substrate for steroidogenesis is ?
Harrison's 18th Ed. 2943

- A. Triglycerides
- B. Cholesterol
- C. Amino acids
- D. Polysaccharides

Cholesterol from diet and from endogenous synthesis is the substrate for steroidogenesis.

394 Uptake of cholesterol by adrenal cortex is mediated by ?
Harrison's 17th Ed. 2248

- A. LDL receptor
- B. HDL receptor
- C. VLDL receptor
- D. None of the above

Uptake of cholesterol by adrenal cortex is mediated by low-density lipoprotein (LDL) receptor.

395 Which of the following is expressed in outer (glomerulosa) cell layer of adrenal cortex ?
Harrison's 17th Ed. 2248

- A. 17-hydroxylase
- B. 21-hydroxylase
- C. Aldosterone synthase

- D. All of the above

Phenomenon of zonation exists in adrenal cortex in which selective genes express enzymes that form specific hormones. Aldosterone synthase is expressed only in outer (glomerulosa) cell layer. 21- & 17-hydroxylase are expressed in (inner) fasciculata-reticularis cell layers, which form cortisol & androgen biosynthesis, respectively.

396 Cortisol circulates in the plasma as ?
Harrison's 18th Ed. 2943

- A. Free cortisol
- B. Protein-bound cortisol
- C. Cortisol metabolites
- D. All of the above

397 Physiologically active form of cortisol is ?
Harrison's 18th Ed. 2943

- A. Free cortisol
- B. Protein-bound cortisol
- C. Cortisol metabolites
- D. All of the above

Cortisol circulates in the plasma as free cortisol, protein-bound cortisol, and cortisol metabolites. Only the unbound cortisol and its metabolites are filterable at the glomerulus.

398 What percentage of circulating cortisol is in the free, bioavailable form ?
Harrison's 17th Ed. 2248

- A. < 5 percent
- B. < 20 percent
- C. < 30 percent
- D. < 40 percent

Free cortisol is a physiologically active hormone that is not protein-bound. Normally, <5% of circulating cortisol is free.

399 Cortisol-binding system in plasma is ?
Harrison's 17th Ed. 2248

- A. Transcortin
- B. Adrenocortin
- C. Epicortin
- D. Anacortin

400 Property of transcortin or cortisol-binding globulin (CBG) is ?
Harrison's 17th Ed. 2248

- A. High-affinity, low-capacity
- B. Low-affinity, high-capacity
- C. High-affinity, high-capacity
- D. Low-affinity, low-capacity

401 Property of albumin for cortisol binding is ?
Harrison's 17th Ed. 2248

- A. High-affinity, low-capacity
- B. Low-affinity, high-capacity
- C. High-affinity, high-capacity
- D. Low-affinity, low-capacity

Plasma has two cortisol-binding systems. One is a high-affinity, low-capacity α_2 -globulin termed transcortin or cortisol-binding globulin (CBG) and albumin which is a low-affinity, high-capacity protein.

402 Cortisol binds to albumin beyond what concentration ?
Harrison's 17th Ed. 2248

- A. 5 µg/dL
- B. 15 µg/dL
- C. 25 µg/dL
- D. 45 µg/dL

When concentration of cortisol is > 25 µg/dL, part of excess binds to albumin.

403 The cortisol-binding globulin (CBG) level is increased in ?

Harrison's 17th Ed. 2248

- A. Pregnancy
- B. Oral contraceptive administration
- C. Both of the above
- D. None of the above

CBG is increased in high-estrogen states (pregnancy, oral contraceptive).

404 Which of the following statements about cortisol metabolites is false ?

Harrison's 17th Ed. 2248

- A. Biologically inactive
- B. Bind weakly to circulating plasma proteins
- C. Low levels in urine are typical of children with 3β-HSD2 deficiency
- D. None of the above

Cortisol metabolites are biologically inactive & bind weakly to circulating plasma proteins.

405 The daily secretion of cortisol ranges between ?

Harrison's 17th Ed. 2248

- A. 5 and 10 mg
- B. 10 and 15 mg
- C. 15 and 30 mg
- D. 30 and 60 mg

Daily secretion of cortisol ranges between 15 & 30 mg (8 - 10 mg/m²), with a pronounced circadian cycle.

406 Steroid inactivation occurs in ?

Harrison's 17th Ed. 2248

- A. Liver
- B. Lung
- C. Kidney
- D. All of the above

Steroid inactivation occurs mainly in liver.

407 11β-hydroxysteroid dehydrogenase 1 (11β-HSD 1) is primarily expressed in ?

Harrison's 18th Ed. 2943

- A. Liver
- B. Lung
- C. Kidney
- D. All of the above

Enzyme that regulates cortisol metabolism is 11-hydroxysteroid dehydrogenase (11β-HSD). Isoform 11β-HSD 1 is primarily expressed in liver.

408 Function of 11β-hydroxysteroid dehydrogenase 1 is ?

Harrison's 18th Ed. 2943

- A. Converting inactive cortisone to active cortisol
- B. Converting cortisol to inactive cortisone

- C. Promote binding of free cortisol to transcortin
- D. Inhibit binding of free cortisol to transcortin

11β-HSD 1 acts as a reductase, converting inactive cortisone to active glucocorticoid, cortisol.

409 Function of 11β-hydroxysteroid dehydrogenase 2 is ?

Harrison's 18th Ed. 2943

- A. Converting cortisone to cortisol
- B. Converting cortisol to cortisone
- C. Promote binding of free cortisol to transcortin
- D. Inhibit binding of free cortisol to transcortin

11β-HSD 2 isoform converts cortisol to the inactive metabolite, cortisone.

410 Average daily secretion of aldosterone ranges between ?

Harrison's 17th Ed. 2248

- A. 5 and 10 µg
- B. 10 and 15 µg
- C. 50 and 250 µg
- D. 300 and 600 µg

With normal salt intake, average daily secretion of aldosterone is between 50 & 250 µg.

411 What percentage of circulating aldosterone is normally inactivated during a single passage through liver ?

Harrison's 17th Ed. 2248

- A. > 10 %
- B. > 25 %
- C. > 50 %
- D. > 75 %

During a single passage through liver, >75% of circulating aldosterone is normally inactivated by conjugation with glucuronic acid.

412 The major androgen secreted by adrenal gland is ?

Harrison's 17th Ed. 2248

- A. Dehydroepiandrosterone (DHEA)
- B. Androstenedione
- C. 11β-hydroxyandrostenedione
- D. Testosterone

Major androgen secreted by adrenal is dehydroepiandrosterone (DHEA) & its sulfuric acid ester (DHEAS). Smaller amounts of androstenedione, 11β-hydroxyandrostenedione & testosterone are secreted.

413 The average daily secretion of androgens by adrenal gland ranges between ?

Harrison's 17th Ed. 2248

- A. 5 to 10 mg
- B. 10 to 15 mg
- C. 15 to 30 mg
- D. 50 to 100 mg

~15 - 30 mg of androgens are secreted daily.

414 In females, almost all urine 17-ketosteroids are derived from ?

Harrison's 17th Ed. 2248

- A. Ovaries
- B. Adrenal
- C. Endometrium
- D. All of the above

DHEA is the major precursor of urinary 17-ketosteroids. 2/3 of urine 17-ketosteroids in male are derived from adrenal metabolites, remaining 1/3 comes from testicular androgens. In female, almost all urine 17-ketosteroids are derived from the adrenal.

415 Steroids pass through the cell membrane by ?

Harrison's 17th Ed. 2248

- A. Passive diffusion
- B. Active transport
- C. Catalytic transport
- D. All of the above

Steroids diffuse passively through the cell membrane and bind to intracellular receptors.

416 Which of the following bind to both glucocorticoid & mineralocorticoid receptors ?

Harrison's 17th Ed. 2248

- A. Glucocorticoids
- B. Mineralocorticoids
- C. Androgens
- D. All of the above

Glucocorticoids & mineralocorticoids bind with nearly equal affinity to the mineralocorticoid receptor (MR). Only glucocorticoids bind to the glucocorticoid receptor (GR).

417 Pro-opiomelanocortin (POMC) is a precursor molecule for ?

Harrison's 17th Ed. 2249

- A. ACTH
- B. β -Endorphin
- C. α -Melanocyte-stimulating hormone
- D. All of the above

ACTH, lipotropins, endorphins & melanocyte-stimulating hormones are processed from a larger precursor molecule proopiomelanocortin (POMC).

418 POMC is made in ?

Harrison's 17th Ed. 2249

- A. Brain
- B. Anterior pituitary
- C. Posterior pituitary
- D. All of the above

419 POMC (Pro-opiomelanocortin) is made in ?

Harrison's 17th Ed. 2249

- A. Anterior pituitary
- B. Posterior pituitary
- C. Lymphocytes
- D. All of the above

POMC is made in brain, anterior & posterior pituitary and lymphocytes.

420 Pro-opiomelanocortin (POMC) is a precursor molecule for ?

Harrison's 17th Ed. 2249

- A. β -Lipotropin
- B. Metenkephalin
- C. Corticotropin-like intermediate lobe protein (CLIP)
- D. All of the above

421 The POMC gene is induced by all except ?

Harrison's 17th Ed. 2249

- A. CRH

- B. Glucocorticoids
- C. Arginine vasopressin
- D. IL-6

422 ACTH is synthesized and stored in ?

Harrison's 17th Ed. 2249

- A. Acidophilic cells of anterior pituitary
- B. Basophilic cells of anterior pituitary
- C. Acidophilic cells of posterior pituitary
- D. Basophilic cells of posterior pituitary

ACTH, a 39-amino-acid peptide, is synthesized & stored in basophilic cells of anterior pituitary.

423 Major factors controlling ACTH release include ?

Harrison's 17th Ed. 2249

- A. Corticotropin-releasing hormone
- B. Free plasma cortisol concentration
- C. Sleep-wake cycle
- D. All of the above

Release of ACTH from anterior pituitary gland is stimulated by corticotropin-releasing hormone (CRH) produced in median eminence of hypothalamus. Free plasma cortisol concentration, stress & sleep-wake cycle also control ACTH release.

424 Neuropeptide 'Urocortin' is related to ?

Harrison's 17th Ed. 2249

- A. ACTH
- B. CRH
- C. Leptin
- D. FSH

Urocortin, a neuropeptide related to CRH, mimics many of the central effects of CRH (appetite suppression, anxiety).

425 Which of the following is released in equimolar concentrations with ACTH ?

Harrison's 17th Ed. 2249

- A. β -Lipotropin
- B. β -endorphin
- C. Corticotropin-like intermediate lobe protein (CLIP)
- D. All of the above

β -lipotropin (β -LPT) is released in equimolar concentrations with ACTH, suggesting that they are cleaved enzymatically from the parent POMC before or during secretory process. β -endorphin levels may or may not correlate with circulating levels of ACTH, depending on the nature of stimulus.

426 The plasma level of ACTH peak ?

Harrison's 17th Ed. 2249

- A. Just prior to waking up
- B. Just after waking up
- C. Before sleeping
- D. After meals

427 The plasma level of ACTH are lowest at ?

Harrison's 17th Ed. 2249

- A. Just prior to waking up
- B. Just after waking up
- C. Before sleeping
- D. After meals

Plasma ACTH peak just prior to waking and a nadir before sleeping.

428 Normal pulsatile, circadian pattern of ACTH release is regulated by ?

Harrison's 17th Ed. 2249

- A. Corticotropin-releasing hormone
- B. Free plasma cortisol concentration
- C. Sleep-wake cycle
- D. All of the above

Normal pulsatile, circadian pattern of ACTH release is regulated by CRH.

429 Stress causes which of the following ?

Harrison's 17th Ed. 2250

- A. Release of CRH
- B. Release of AVP
- C. Activation of sympathetic nervous system
- D. All of the above

Stress (pyrogens, surgery, hypoglycemia, exercise & severe emotional trauma) causes the release of CRH and arginine vasopressin (AVP) and activation of the sympathetic nervous system.

430 Factors increasing ACTH release include ?

Harrison's 17th Ed. 2250

- A. Response to eating
- B. Vasopressin
- C. Angiotensin II
- D. All of the above

ACTH & cortisol levels increase in response to eating. ACTH release is regulated by the level of free cortisol in plasma.

431 Factors decreasing ACTH release include ?

Harrison's 17th Ed. 2250

- A. β -endorphin
- B. Enkephalin
- C. Inflammatory cytokines
- D. All of the above

432 The biologic half-life of ACTH in the circulation is ?

Harrison's 17th Ed. 2250

- A. < 10 minutes
- B. < 15 minutes
- C. < 30 minutes
- D. < 60 minutes

Biologic half-life of ACTH in the circulation is <10 minutes.

433 During critical illness, levels of corticosteroid-binding globulin ?

N Engl J Med 2003;348:727-34

- A. Decrease
- B. Increase
- C. Remain same
- D. All of the above

434 Suppression of the hypothalamic-pituitary-adrenal axis has been reported with ?

N Engl J Med 2003;348:727-34

- A. Exogenous corticosteroid therapy for > 3 weeks
- B. Medroxyprogesterone

- C. Megestrol acetate
- D. All of the above

435 What level of cortisol level best identifies persons with clinical features of corticosteroid insufficiency ?

N Engl J Med 2003;348:727-34

- A. <15 μ g per deciliter
- B. <25 μ g per deciliter
- C. <35 μ g per deciliter
- D. <45 μ g per deciliter

436 Synthetic peptide consisting of the first 24 amino acids of corticotropin and used in corticotropin stimulation test is ?

N Engl J Med 2003;348:727-34

- A. Cosyntropin
- B. Syntropin
- C. Adrenomedulin
- D. All of the above

437 Insulin-tolerance test should not be performed in patients with ?

N Engl J Med 2003;348:727-34

- A. Ischemic heart disease
- B. Epilepsy
- C. Severe cortisol deficiency
- D. All of the above

438 Which of the following is an angiotensin receptor ?

Harrison's 17th Ed. 2250

- A. AT1 α
- B. AT1 β
- C. AT2
- D. All of the above

Angiotensin receptors are AT1 α , AT1 β and AT2.

439 Most effects of angiotensin II are mediated by ?

Harrison's 17th Ed. 2250

- A. AT1 receptor
- B. AT2 receptor
- C. AT3 receptor
- D. AT4 receptor

Most of the effects of angiotensins II & III are mediated by AT1 receptor.

440 Renin is a ?

Harrison's 17th Ed. 2250

- A. Proteolytic enzyme
- B. Hormone
- C. Prohormone
- D. Cytokine

Renin is a proteolytic enzyme produced & stored in granules of juxta-glomerular cells surrounding afferent arterioles of glomeruli in kidney.

441 Renin acts on ?

Harrison's 17th Ed. 2250

- A. Angiotensinogen
- B. Angiotensin I

- C. Angiotensin II
- D. All of the above

442 Angiotensinogen is made in ?

Harrison's 17th Ed. 2250

- A. Liver
- B. Kidney
- C. Lung
- D. Intestines

Renin acts on angiotensinogen which is a circulating α_2 -globulin produced in liver to form the decapeptide angiotensin I.

443 Half-life of renin is ?

Harrison's 17th Ed. 2250

- A. 2 - 4 minutes
- B. 5 - 10 minutes
- C. 10 - 20 minutes
- D. 30 - 45 minutes

Half-life of renin is 10 - 20 minutes.

444 Tissues that have a local renin-angiotensin system & produce angiotensin II include all except ?

Harrison's 17th Ed. 2250

- A. Uterus
- B. Placenta
- C. Vascular tissue
- D. Ovaries

445 Tissues that have a local renin-angiotensin system and produce angiotensin II include all except ?

Harrison's 17th Ed. 2250

- A. Heart
- B. Brain
- C. Adrenal cortex
- D. Pancreas

Tissues that have a local renin-angiotensin system & ability to produce angiotensin II are uterus, placenta, vascular tissue, heart, brain, adrenal cortex and kidney.

446 Angiotensin-converting enzyme (ACE) is present mostly in ?

Harrison's 17th Ed. 2250

- A. Pulmonary vascular endothelium
- B. Liver
- C. Kidneys
- D. Intestines

ACE is present in pulmonary vascular endothelium, converts Angiotensin I to octapeptide angiotensin II.

447 Which of the following is false ?

Harrison's 17th Ed. 2250

- A. Angiotensin I is a decapeptide
- B. Angiotensin II is an octapeptide
- C. Angiotensin III is a heptapeptide
- D. None of the above

Angiotensin I is a decapeptide. Angiotensin II is an octapeptide. angiotensin III is a heptapeptide.

448 Which of the following is false about 'juxtaglomerular cells' ?

Harrison's 17th Ed. 2251

- A. Specialized myoepithelial cells
- B. Cuff efferent arterioles
- C. Act as pressure transducers
- D. Release renin

Juxtaglomerular cells are specialized myoepithelial cells that cuff the afferent arterioles. They may be seen as miniature pressure transducers, sensing renal perfusion pressure & changes in afferent arteriolar perfusion pressures.

449 Which of the following is false about macula densa cells ?

Harrison's 17th Ed. 2251

- A. DCT epithelial cells
- B. Directly opposed to juxtaglomerular cells
- C. Chemoreceptors
- D. Monitor potassium load

Macula densa cells are a group of distal convoluted tubular epithelial cells directly opposed to juxtaglomerular cells. They function as chemoreceptors, monitoring sodium (or chloride) load presented to the distal tubule.

450 Factor that decreases renin release is ?

Harrison's 16th Ed. 2131

- A. Atrial natriuretic peptide
- B. Increased dietary potassium
- C. Angiotensin II
- D. All of the above

Increased dietary intake of potassium decreases renin release, whereas decreased potassium intake increases it. Angiotensin II exerts negative feedback control on renin release that is independent of alterations in renal blood flow, blood pressure, or aldosterone secretion. Atrial natriuretic peptides also inhibit renin release.

451 Glucocorticoids raise the blood glucose level by ?

Harrison's 17th Ed. 2251

- A. Suppressing secretion of insulin
- B. Inhibiting peripheral glucose uptake
- C. Gluconeogenesis
- D. All of the above

Glucocorticoids raise blood glucose level by antagonizing secretion & actions of insulin, thereby inhibiting peripheral glucose uptake, which promotes hepatic glucose synthesis (gluconeogenesis) & hepatic glycogen content.

452 Glucocorticoids deplete ?

Harrison's 17th Ed. 2251

- A. T lymphocytes
- B. B lymphocytes
- C. Eosinophils
- D. All of the above

453 Glucocorticoids inhibit all of the following except ?

Harrison's 17th Ed. 2251

- A. Lymphokines
- B. Prostaglandins
- C. IL-1 & IL-6
- D. Angiotensin convertig enzyme

Glucocorticoids inhibit production & action of mediators of inflammation (lymphokines & prostaglandins), interferon by T lymphocytes, IL-1 & IL-6 by macrophages. IL-1 is an endogenous pyrogen.

454 Glucocorticoids inhibit all of the following except ?*Harrison's 17th Ed. 2251*

- A. Bradykinin
- B. Vasopressin
- C. Serotonin
- D. Renin

Glucocorticoids inhibit production & inflammatory effects of bradykinin, platelet-activating factor, serotonin, T cell growth factor (IL-2) by T lymphocytes, reverse macrophage activation & antagonize action of migration-inhibiting factor (MIF), prostaglandin & leukotriene.

455 Cortisol suppresses which of the following ?*Harrison's 17th Ed. 2252*

- A. Pituitary POMC
- B. Hypothalamic CRH
- C. Vasopressin
- D. All of the above

456 Mineralocorticoids major determinants of the metabolism of ?*Harrison's 17th Ed. 2252*

- A. Sodium
- B. Potassium
- C. Chloride
- D. All of the above

Mineralocorticoids are the major determinants of potassium metabolism mediated by the binding of aldosterone to MR in epithelial cells (principal cells in renal cortical collecting duct).

457 Mineralocorticoids act on the epithelium of ?*Harrison's 17th Ed. 2252*

- A. Salivary ducts
- B. Sweat glands
- C. Gastrointestinal tract
- D. All of the above

Mineralocorticoids act on epithelium of the salivary ducts, sweat glands & gastrointestinal tract to cause reabsorption of sodium in exchange for potassium.

458 Mineralocorticoids cause reabsorption of sodium in exchange for potassium in ?*Harrison's 17th Ed. 2252*

- A. Gastrointestinal tract
- B. Epithelium of salivary ducts
- C. Sweat glands
- D. All of the above

459 Escape phenomenon in kidneys pertains to which hormone ?*Harrison's 17th Ed. 2252*

- A. Aldosterone
- B. Renin
- C. Angiotensin II
- D. Potassium

Aldosterone initially causes sodium retention followed by natriuresis to reestablish sodium balance in 3 - 5 days preventing edema. This process is called escape phenomenon. It signifies an "escape" by renal tubules from the sodium-retaining action of aldosterone. There is no escape from the potassium-losing effects of mineralocorticoids.

460 Mineralocorticoid receptor is found in ?*Harrison's 17th Ed. 2252*

- A. Neurons in brain

- B. Myocytes
- C. Endothelial cells
- D. All of the above

MR is found in nonepithelial cells like neurons in brain, myocytes, endothelial cells & vascular smooth-muscle cells.

461 Primary mechanism that controls aldosterone release is ?*Harrison's 17th Ed. 2252 Table 336-1*

- A. Renin-angiotensin system
- B. Potassium
- C. ACTH
- D. All of the above

Primary mechanisms that control adrenal aldosterone secretion are renin-angiotensin system, potassium & ACTH.

462 Which of the following does not stimulate aldosterone secretion ?*Harrison's 17th Ed. 2252 Table 336-1*

- A. Potassium ion
- B. ACTH
- C. Serotonin
- D. Dopamine

463 Which of the following does not stimulate aldosterone biosynthesis ?*Harrison's 17th Ed. 2252 Table 336-1*

- A. β -endorphin
- B. Endothelin
- C. Atrial natriuretic peptide
- D. Serotonin

464 Which of the following inhibit aldosterone biosynthesis ?*Harrison's 17th Ed. 2252 Table 336-1*

- A. Dopamine
- B. Atrial natriuretic peptide
- C. Ouabain-like factors
- D. All of the above

Potassium, serotonin, ACTH, β -endorphin and endothelin stimulate aldosterone biosynthesis. Sodium, dopamine, atrial natriuretic peptide and Ouabain-like factors inhibit aldosterone biosynthesis.

465 Adrenal androgen formation is regulated by ?*Harrison's 17th Ed. 2253*

- A. ACTH
- B. Gonadotropins
- C. γ -melanocyte-stimulating hormone
- D. β -endorphin

Adrenal androgen formation is regulated by ACTH, not by gonadotropins. Adrenal androgens are suppressed by exogenous glucocorticoids.

466 Which of the following is the most potent androgen ?*Harrison's 17th Ed. 2253*

- A. DHEA
- B. Androstenedione
- C. 11-hydroxyandrostenedione
- D. Testosterone

The principal adrenal androgens are DHEA, androstenedione, and 11-hydroxyandrostenedione. Testosterone is a gonadal steroid. DHEA & androstenedione are weak androgens & exert their effects via conversion to potent androgen testosterone in extraglandular tissues.

467 Angiotensin II plasma levels are influenced by ?

Harrison's 17th Ed. 2253

- A. Dietary sodium intake
- B. Dietary potassium intake
- C. Posture
- D. All of the above

Angiotensin II levels are influenced by dietary sodium, potassium intakes & posture. Upright posture & sodium restriction elevate angiotensin II levels.

468 Peripheral plasma renin activity (PRA) is gauged by generation of which of the following during a standardized incubation period ?

Harrison's 17th Ed. 2253

- A. Angiotensin I
- B. Angiotensin II
- C. Angiotensin III
- D. All of the above

In Plasma renin activity (PRA), renin activity is gauged by the generation of angiotensin I during a standardized incubation period. Plasma angiotensinogen acts as substrate.

469 PRA and active renin correlate less well on ?

Harrison's 17th Ed. 2253

- A. Low-sodium diets
- B. High-sodium diets
- C. Low-potassium diets
- D. High-potassium diets

PRA depends on dietary sodium intake patient's ambulatory status. PRA has a diurnal rhythm with peak values in morning & a nadir in afternoon. PRA & active renin correlate very well on low-sodium diets but less well on high-sodium diets.

470 The plasma level of aldosterone is increased by ?

Harrison's 17th Ed. 2253

- A. Dietary potassium loading
- B. Sodium restriction
- C. Upright posture
- D. All of the above

471 The plasma level of cortisol is increased by ?

Harrison's 17th Ed. 2253

- A. Dietary potassium loading
- B. Sodium restriction
- C. Upright posture
- D. None of the above

Plasma level of aldosterone, but not of cortisol, is increased by dietary potassium loading, sodium restriction or by assumption of upright posture.

472 Which compound of DHEA is a useful index of adrenal androgen secretion ?

Harrison's 17th Ed. 2253

- A. Sulfate
- B. Phosphate
- C. Chloride
- D. None of the above

Measurement of the sulfate conjugate of DHEA is a useful index of adrenal androgen secretion, as little DHEA sulfate is formed in gonads.

473 Urine 17-ketosteroid values are highest in ?

Harrison's 17th Ed. 2253

- A. Infants
- B. Young adults
- C. Middle age
- D. Old age

Urine 17-KS originate in adrenal gland or gonad. In normal women, 90% of urinary 17-KS is derived from adrenal while in men 60 - 70% is of adrenal origin. Urine 17-KS is highest in young adults & decline with age.

474 Rapid ACTH stimulation test is performed ?

Harrison's 17th Ed. 2253

- A. Early morning
- B. Afternoon
- C. Late evening
- D. Any time of the day

Rapid ACTH stimulation test can be performed at any time of the day. It involves administration of 25 units (0.25 mg) of cosyntropin IV or IM & measurement of plasma cortisol levels before administration, 30 & 60 minutes after administration.

475 Criterion for a normal response in "Rapid ACTH stimulation test" is a cortisol level of ?

Harrison's 17th Ed. 2253

- A. >8 µg/dL above baseline
- B. >12 µg/dL above baseline
- C. >16 µg/dL above baseline
- D. >18 µg/dL above baseline

Criterion for a normal rapid ACTH stimulation test response is a stimulated cortisol level of >500 nmol/L (>18 µg/dL), and the minimal stimulated normal increment of cortisol is >200 nmol/L (>7 g/dL) above baseline.

476 Normally, in screening 'overnight dexamethasone suppression test', plasma cortisol level at 8 AM should be ?

Harrison's 17th Ed. 2253

- A. < 5 µg/dL
- B. < 10 µg/dL
- C. < 15 µg/dL
- D. < 20 µg/dL

The best screening procedure to test pituitary-adrenal suppressibility is the overnight dexamethasone suppression test. Measurement of plasma cortisol levels at 8 AM following oral administration of 1 mg dexamethasone the previous midnight is done. 8 AM value for plasma cortisol in normal individuals should be <140 nmol/L (5 µg/dL).

477 Cushing's disease refers to ?

Harrison's 18th Ed. 2945

- A. ACTH-producing pituitary tumor
- B. Exogenous ACTH tumor
- C. Pituitary ACTH-secreting tumor
- D. All of the above

478 Cushing's syndrome refers to ?

Harrison's 18th Ed. 2945

- A. Exogenous ACTH tumor
- B. Adrenal tumor
- C. Pituitary ACTH-secreting tumor

- D. All of the above

Traditionally, only basophilic ACTH-producing pituitary tumor is defined as Cushing's disease. Cushing's syndrome refers to all causes of excess cortisol like exogenous ACTH tumor, adrenal tumor, basophilic pituitary ACTH-secreting tumor, or excessive glucocorticoid treatment.

479 Which of the following is false about 'Ectopic ACTH syndrome' ?

Harrison's 17th Ed. 2255

- A. Caused by nonpituitary tumors secreting ACTH /CRH
- B. Bilateral adrenal hyperplasia
- C. Typical s/s of Cushing's syndrome present
- D. Hypokalemic alkalosis

Ectopic ACTH syndrome is caused by nonpituitary tumors that secrete either ACTH and/or CRH & cause bilateral adrenal hyperplasia. Ectopic production of CRH results in clinical, biochemical, and radiologic features indistinguishable from those caused by hypersecretion of pituitary ACTH. Typical signs & symptoms of Cushing's syndrome may be absent or minimal with ectopic ACTH production & hypokalemic alkalosis is a prominent manifestation.

480 Which of the following can cause 'Ectopic ACTH syndrome' ?

Harrison's 18th Ed. 2945

- A. Oat cell bronchogenic carcinoma
- B. Carcinoid tumors of thymus, pancreas, ovary
- C. Medullary carcinoma of thyroid
- D. All of the above

Most cases of Ectopic ACTH syndrome are associated with primitive small cell (oat cell) bronchogenic carcinoma, carcinoid tumors of thymus, pancreas, ovary, medullary carcinoma of thyroid, or bronchial adenomas.

481 Which of the following is a cause of ACTH-independent Cushing's syndrome ?

Harrison's 18th Ed. 2945

- A. ACTH-independent macronodular hyperplasia (AIMAH)
- B. Primary pigmented nodular adrenal disease (PPNAD)
- C. McCune-Albright syndrome
- D. All of the above

482 In ACTH-independent macronodular hyperplasia (AIMAH), which of the following receptor is ectopically expressed in the adrenal gland ?

Harrison's 18th Ed. 2945

- A. Luteinizing hormone
- B. Vasopressin
- C. Serotonin
- D. All of the above

In ACTH-independent macronodular hyperplasia (AIMAH), adrenal cortisol excess occurs due to ectopic expression of receptors not usually found in adrenals. These include receptors for luteinizing hormone, vasopressin, serotonin, interleukin-1, or gastric inhibitory peptide (GIP). Activation of these receptors results in upregulation of PKA signaling with a subsequent increase in cortisol production.

483 Primary pigmented nodular adrenal disease (PPNAD) is best related to which of the following ?

Harrison's 18th Ed. 2945

- A. Crow-Fukase Syndrome
- B. Hirschsprung disease
- C. Carney's complex
- D. Von Hippel–Lindau syndrome

Mutations in a regulatory subunit of PKA (PRKAR1A) are found in primary pigmented nodular adrenal disease (PPNAD) as part of Carney's complex.

484 Which of the following is a feature of Carney's complex ?

Harrison's 18th Ed. 2945

- A. Cardiac myxomas
- B. Hyperlentiginosis
- C. Sertoli's cell tumors
- D. All of the above

Carney's complex is an autosomal dominant multiple neoplasia condition associated with cardiac myxomas, hyperlentiginosis, Sertoli's cell tumors, and PPNAD.

485 McCune-Albright syndrome is caused by activating mutations in which of the following ?

Harrison's 18th Ed. 2945

- A. GNAS-1
- B. PKA
- C. CREB
- D. StAR

McCune-Albright syndrome can cause ACTH-independent Cushing's syndrome. It features polyostotic fibrous dysplasia, unilateral café-au-lait spots, and precocious puberty. McCune-Albright syndrome is caused by activating mutations in GNAS-1 (guanine nucleotide binding protein alpha stimulating activity polypeptide 1).

486 Which of the following is the commonest feature of 'Cushing's syndrome' ?

Harrison's 17th Ed. 2255 Table 336-3

- A. Centripetal obesity
- B. Hypertension
- C. Hirsutism
- D. Proximal myopathy

487 Which of the following is suggestive of Cushing's syndrome ?

Harrison's 16th Ed. 2135

- A. Urine free cortisol > 50 µg/day
- B. Plasma cortisol > 5 µg/dL after standard low-dose dexamethasone suppression test
- C. Absence of normal fall of plasma cortisol at midnight
- D. All of the above

488 Most common cause of Cushing's syndrome is ?

Harrison's 18th Ed. 2946

- A. Iatrogenic administration of steroids
- B. Adrenal macronodular hyperplasia
- C. Adrenal micronodular dysplasia
- D. Adrenal neoplasia

The most common cause of Cushing's syndrome is iatrogenic administration of steroids.

489 Decreased bone mineralization due to use of steroids is particularly pronounced in ?

Harrison's 17th Ed. 2255

- A. Children
- B. Adults
- C. Elderly
- D. All of the above

Decreased bone mineralization is particularly pronounced in children.

490 Which of the following is typical of Cushing's syndrome ?

Harrison's 17th Ed. 2255

- A. Moon facies
- B. Buffalo hump

- C. Truncal obesity
- D. All of the above

Hypercortisolism promotes deposition of adipose tissue in upper face (moon facies), interscapular area (buffalo hump), supraclavicular fat pads & mesenteric bed (truncal obesity). Rarely, episternal fatty tumors and mediastinal widening secondary to fat accumulation occur.

491 Which of the following features of Cushing's syndrome is considered more specific ?

Harrison's 17th Ed. 2255

- A. Hypertension
- B. Osteoporosis
- C. Broad violaceous cutaneous striae
- D. Obesity

Signs & symptoms of hypercortisolism (obesity, hypertension, osteoporosis & diabetes) are nonspecific. Easy bruising, typical striae, myopathy & virilizing signs are more suggestive of Cushing's syndrome.

492 What value of a 24-hour urine free cortisol is suggestive of Cushing's syndrome ?

Harrison's 17th Ed. 2256

- A. > 5 µg/day
- B. > 25 µg/day
- C. > 50 µg/day
- D. > 150 µg/day

A 24-hour urine free cortisol level of >140 nmol/day (50 µg/day) is suggestive of Cushing's syndrome.

493 In Cushing's syndrome, after a standard low-dose dexamethasone suppression test, urinary cortisol to fall to ?

Harrison's 17th Ed. 2256

- A. < 10 µg/day
- B. < 20 µg/day
- C. < 30 µg/day
- D. < 40 µg/day

494 In Cushing's syndrome, after a standard low-dose dexamethasone suppression test, plasma cortisol to fall to ?

Harrison's 17th Ed. 2256

- A. < 5 µg/dL
- B. < 8 µg/dL
- C. < 10 µg/dL
- D. < 16 µg/dL

In Cushing's syndrome, definitive diagnosis is established by failure of urinary cortisol to fall to <25 nmol/day (10 µg/day) or of plasma cortisol to fall to <140 nmol/L (5 µg/dL) after a standard low-dose dexamethasone suppression test (0.5 mg every 6 hour for 48 hours). High-dose dexamethasone administration means 2 mg every 6 hour for 48 hours or 8-mg overnight.

495 Normal plasma ACTH level is ?

Harrison's 17th Ed. 2256

- A. < 60 pg/mL
- B. < 80 pg/mL
- C. < 100 pg/mL
- D. < 120 pg/mL

Normal ACTH levels are <14 pmol/L i.e. <60 pg/mL.

496 Features suggestive of adrenocortical carcinoma (ACC) include all except ?

Harrison's 17th Ed. 2258

- A. Size > 4 - 6 cm

- B. Soft tissue calcifications visible on CT
- C. Tumor inhomogeneity
- D. Low unenhanced CT values (<10 HU)

Features suggestive of malignancy include large size (>4 - 6 cm), irregular margins & tumor inhomogeneity, soft tissue calcifications visible on CT & high unenhanced CT attenuation values (>10 HU).

497 Principal drug for the treatment of adrenocortical carcinoma (ACC) is ?

Harrison's 18th Ed. 2949

- A. Mitotane
- B. Ketoconazole
- C. Mifepristone
- D. Metyrapone

Principal drug for treatment of ACC is mitotane (o,p'-DDD), isomer of DDT.

498 Chemical adrenalectomy can be done by ?

Harrison's 18th Ed. 2949

- A. Ketoconazole
- B. Mitotane
- C. Metyrapone
- D. All of the above

Chemical adrenalectomy can be done with ketoconazole or mitotane or aminoglutethimide or metyrapone or Mifepristone. These are not curative but effective as long as chronically administered in selected patients.

499 Criteria for the diagnosis of primary aldosteronism include ?

Harrison's 17th Ed. 2260

- A. Diastolic hypertension without edema
- B. Hyposecretion of renin (low PRA levels) that do not increase during volume depletion
- C. Hypersecretion of aldosterone that does not suppress in response to volume expansion
- D. All of the above

Criteria for the diagnosis of primary aldosteronism are diastolic hypertension without edema, hyposecretion of renin (low PRA levels) that fails to increase appropriately during volume depletion (upright posture, sodium depletion), and hypersecretion of aldosterone that does not suppress appropriately in response to volume expansion.

500 Which of the following is false about primary aldosteronism ?

Harrison's 17th Ed. 2260

- A. Hypokalemia
- B. Diastolic hypertension
- C. No edema
- D. None of the above

Hypersecretion of aldosterone causes hypokalemia, diastolic hypertension, headaches, polyuria, polydipsia, left ventricular hypertrophy disproportionate to level of BP. Edema is characteristically absent they exhibit an "escape" phenomenon from the sodium-retaining aspects of mineralocorticoids.

501 Which of the following is false about bilateral cortical nodular hyperplasia ?

Harrison's 17th Ed. 2260

- A. ~80% of patients with primary aldosteronism
- B. Hypokalemia less likely
- C. Less radiologic evidence for adrenal pathology
- D. None of the above

Patients with bilateral hyperplasia are unlikely to have hypokalemia & have lower levels of aldosterone & less radiologic evidence for adrenal pathology. They constitute ~80% of patients

with primary aldosteronism. Hypertension associated with idiopathic bilateral nodular hyperplasia does not usually benefit from bilateral adrenalectomy, whereas hypertension associated with aldosterone-producing tumors is usually improved or cured by removal of the adenoma.

502 What ratio of serum aldosterone to PRA suggests autonomy of aldosterone secretion ?

Harrison's 17th Ed. 2260

- A. > 10
- B. > 15
- C. > 20
- D. > 30

Ratio of serum aldosterone to plasma renin activity if high (>30) strongly suggests autonomy of aldosterone secretion in all normokalemic/hypokalemic and difficult-to-control hypertensive patients.

503 Drug that is of use in primary aldosteronism is ?

Harrison's 17th Ed. 2262

- A. Spironolactone
- B. Eplerenone
- C. Triamterene
- D. All of the above

504 Increased production of aldosterone occurs in secondary aldosteronism in response to ?

Harrison's 17th Ed. 2262

- A. Activation of sympathetic system
- B. Activation of parasympathetic system
- C. Activation of renin-angiotensin system
- D. All of the above

In secondary aldosteronism, an appropriately increased production of aldosterone in response to activation of renin-angiotensin system occurs.

505 Secondary aldosteronism occurs in association with ?

Harrison's 17th Ed. 2262

- A. Accelerated phase of hypertension
- B. Underlying edema disorder
- C. Bartter & Gitelman syndromes
- D. All of the above

Secondary aldosteronism occurs with accelerated phase of hypertension or an underlying edema disorder. Secondary hyperaldosteronism occurs without edema or hypertension in Bartter & Gitelman syndromes.

506 Secondary aldosteronism is a feature of ?

Harrison's 17th Ed. 2262

- A. Cirrhosis
- B. Nephrotic syndrome
- C. Congestive heart failure
- D. All of the above

Secondary aldosteronism is present edematous states like cirrhosis, nephrotic syndrome and congestive heart failure. Stimulus for aldosterone release is arterial hypovolemia and/or hypotension.

507 As compared to essential hypertension, patients with primary aldosteronism have a higher incidence of ?

Harrison's 17th Ed. 2262

- A. Left ventricular hypertrophy (LVH)
- B. Albuminuria
- C. Stroke
- D. All of the above

508 What percentage of adrenal glands are destroyed before adrenal insufficiency appears ?

Harrison's 17th Ed. 2263

- A. > 25 %
- B. > 50 %
- C. > 75 %
- D. > 90 %

Addison's disease results from progressive destruction of adrenals, which must involve >90% of the glands before adrenal insufficiency appears.

509 Adrenals is a frequent site for which of the following chronic granulomatous diseases ?

Harrison's 17th Ed. 2263

- A. Tuberculosis
- B. Histoplasmosis
- C. Coccidioidomycosis
- D. All of the above

The adrenal is a frequent site for chronic granulomatous diseases, mainly tuberculosis but also histoplasmosis, coccidioidomycosis & cryptococcosis.

510 Specific adrenal antigens to which autoantibodies may be directed include ?

Harrison's 17th Ed. 2263

- A. SOX9
- B. 21-hydroxylase (CYP21A2)
- C. RSP01
- D. CYP19

Specific adrenal antigens to which autoantibodies may be directed include 21-hydroxylase (CYP21A2).

511 In Addison's disease, which of the following also occur with increased frequency ?

Harrison's 17th Ed. 2263

- A. Chronic lymphocytic thyroiditis
- B. Premature ovarian failure
- C. Type 1 diabetes mellitus
- D. All of the above

512 In Addison's disease, which of the following also occur with increased frequency ?

Harrison's 17th Ed. 2263

- A. Hypo- or hyperthyroidism
- B. Pernicious anemia
- C. Myasthenia gravis
- D. All of the above

In Addison's disease, there is an increased incidence of chronic lymphocytic thyroiditis, premature ovarian failure, type 1 diabetes mellitus, hypo- or hyperthyroidism, pernicious anemia, vitiligo, alopecia, nontropical sprue & myasthenia gravis.

513 Mutant gene in Type I polyglandular syndrome is on ?

Harrison's 17th Ed. 2263

- A. Chromosome 12
- B. Chromosome 16
- C. Chromosome 18
- D. Chromosome 21

514 "C" in APECED gene stands for ?

Harrison's 17th Ed. 2263

- A. Carcinoma
- B. Candidiasis
- C. Calcinosis
- D. Caif-au-lait

Type I polyglandular syndrome is caused by mutations in the autoimmune polyendocrinopathy candidiasis ectodermal dystrophy (APECED) gene located on chromosome 21q22.3.

515 Mutant gene in Type II polyglandular syndrome is on ?

Harrison's 17th Ed. 2263

- A. Chromosome 4
- B. Chromosome 6
- C. Chromosome 8
- D. Chromosome 10

Type II polyglandular syndrome is associated with a mutant gene on chromosome 6 as well as with HLA alleles B8 and DR3.

516 Type I polyglandular autoimmune syndrome consists of all except ?

Harrison's 17th Ed. 2263

- A. Parathyroid insufficiency
- B. Adrenal insufficiency
- C. Chronic mucocutaneous candidiasis
- D. Myasthenia gravis

Combination of parathyroid & adrenal insufficiency & chronic mucocutaneous candidiasis constitutes type I polyglandular autoimmune syndrome. Pernicious anemia, chronic active hepatitis, alopecia, primary hypothyroidism, and premature gonadal failure may also be associated.

517 Which of the following may cause or potentiate adrenal insufficiency ?

Harrison's 17th Ed. 2263

- A. Rifampin
- B. Phenytoin
- C. Ketoconazole
- D. All of the above

Medications like rifampin, phenytoin, ketoconazole, megestrol & opiates may cause or potentiate adrenal insufficiency.

518 Which of the following is the most frequent presentation in adrenal insufficiency ?

Harrison's 17th Ed. 2263 Table 336-7

- A. Weakness
- B. Pigmentation of mucous membranes
- C. Salt craving
- D. Diarrhea

519 Which of the following is an early sign of hyperpigmentation in Addison's disease ?

Harrison's 17th Ed. 2263

- A. Darkening of areolae of nipples
- B. Bluish-black patches on mucous membranes
- C. Persistent tanning following sun exposure
- D. Dark freckles

Persistent tanning following sun exposure is an early sign in Addison's disease.

520 Hematologic abnormalities seen in adrenal insufficiency is ?

Harrison's 17th Ed. 2264

- A. Normocytic anemia
- B. Relative lymphocytosis
- C. Moderate eosinophilia
- D. All of the above

521 In rapid ACTH stimulation test, dose of cosyntropin is ?

Harrison's 17th Ed. 2264

- A. 50 µg
- B. 150 µg
- C. 250 µg
- D. 500 µg

In rapid ACTH stimulation test, 250 µg of cosyntropin is given IM or IV.

522 In rapid ACTH stimulation test, cortisol level at 60 minutes after cosyntropin should be ?

Harrison's 17th Ed. 2264

- A. > 6 µg/dL
- B. > 12 µg/dL
- C. > 18 µg/dL
- D. > 24 µg/dL

In adrenal insufficiency, upon ACTH stimulation testing, cortisol level at 60 minutes after cosyntropin should be > 18 µg/dL.

523 Primary & secondary adrenal insufficiency can be distinguished by measuring ?

Harrison's 17th Ed. 2264

- A. Renin
- B. Aldosterone
- C. Angiotensin I
- D. Angiotensin II

If rapid ACTH stimulation test is abnormal, then primary and secondary adrenal insufficiency can be distinguished by measuring aldosterone levels from the same blood samples. In secondary adrenal insufficiency, the aldosterone increment will be normal (> 5 ng/dL). In primary adrenal insufficiency, plasma ACTH and associated peptides (β-LPT) are elevated.

524 Which of the following is given in the treatment of adrenal insufficiency ?

Harrison's 17th Ed. 2264

- A. Hydrocortisone
- B. Fludrocortisone
- C. DHEA
- D. All of the above

Replacement therapy in adrenal insufficiency aims to correct both glucocorticoid & mineralocorticoid deficiencies by hydrocortisone and fludrocortisone respectively. In females with adrenal insufficiency and low androgen levels, DHEA may improve quality of life & bone mineral density.

525 What proportion of total glucocorticoid dose should be given in morning ?

Harrison's 17th Ed. 2264

- A. One third
- B. One half
- C. Two third
- D. Three fourth

Dose of hydrocortisone for most adults is 20 - 30 mg/day. To simulate normal diurnal adrenal rhythm, two-thirds of the dose is taken in morning & remaining one-third is taken in late afternoon.

526 In adrenal insufficiency, during fever, the dose of hydrocortisone should be ?

Harrison's 17th Ed. 2264

- A. Kept the same
- B. Doubled
- C. Tripled
- D. Quadrupled

During periods of intercurrent illness (fever), dose of hydrocortisone should be doubled.

527 In Addison's disease, mineralocorticoid administration is unnecessary at hydrocortisone doses of ?

Harrison's 17th Ed. 2265

- A. > 10 mg/day
- B. > 40 mg/day
- C. > 80 mg/day
- D. > 100 mg/day

In Addison's disease, mineralocorticoid administration is unnecessary at hydrocortisone doses of >100 mg/day because of the mineralocorticoid effects of hydrocortisone at such dosages.

528 Which of the following favors a diagnosis of primary adrenocortical insufficiency ?

Harrison's 17th Ed. 2265

- A. Dehydration
- B. Hyponatremia
- C. Hyperkalemia
- D. All of the above

Severe dehydration, hyponatremia, and hyperkalemia are characteristic of severe mineralocorticoid insufficiency and favor a diagnosis of primary adrenocortical insufficiency.

529 Which of the following is false about secondary adrenocortical insufficiency ?

Harrison's 17th Ed. 2265

- A. No hyperpigmentation
- B. Low ACTH level
- C. Near-normal aldosterone secretion
- D. None of the above

Patients with secondary adrenocortical hypofunction are not hyperpigmented, have low ACTH levels, evidence of multiple hormone deficiencies, have near-normal level of aldosterone secretion.

530 Acute adrenocortical insufficiency may result from ?

Harrison's 17th Ed. 2265

- A. Meningococcal septicemia
- B. Anticoagulant therapy
- C. Pregnancy
- D. All of the above

531 Acute adrenocortical insufficiency may result from ?

Harrison's 17th Ed. 2265

- A. Pseudomonas septicemia
- B. Coagulation disorder
- C. Rapid withdrawal of steroids
- D. All of the above

Acute adrenocortical insufficiency may result from septicemia with Pseudomonas or meningococemia (Waterhouse-Friderichsen syndrome), anticoagulant therapy or a coagulation disorder, bilateral adrenal hemorrhage in newborn due to birth trauma, during pregnancy, following idiopathic adrenal vein thrombosis, as a complication of venography, rapid withdrawal of steroids from those on chronic steroid therapy, congenital adrenal hyperplasia, those on mitotane, ketoconazole, phenytoin, rifampin.

532 During stress, plasma cortisol levels should be constantly maintained at ?

Harrison's 17th Ed. 2265

- A. 10 µg/dL
- B. 20 µg/dL
- C. 30 µg/dL
- D. 40 µg/dL

Continuous hydrocortisone infusion maintains plasma cortisol constantly at stress levels of 30 µg/dL.

533 Which of the following is false in acutely ill patients ?

Harrison's 17th Ed. 2266

- A. Cortisol levels rise four- to sixfold
- B. Diurnal variation is abolished
- C. Unbound fractions of cortisol rises
- D. None of the above

During critical illnesses cortisol levels rise 4 - 6 fold, diurnal variation is abolished & unbound fractions of cortisol rise in circulation & target tissues.

534 Functional or relative adrenal insufficiency is ?

Harrison's 17th Ed. 2266

- A. Adrenal insufficiency on withdrawal of long term steroids
- B. Subnormal cortisol production during acute severe illness
- C. Failure to take replacement therapy in adrenal insufficiency
- D. Ineffective replacement therapy in adrenal insufficiency

Subnormal cortisol production during acute severe illness has been termed "functional" or "relative" adrenal insufficiency.

535 Following cosyntropin, increment of less than what between peak & baseline cortisol levels defines relative adrenal insufficiency ?

Harrison's 17th Ed. 2266

- A. < 3 µg/dL
- B. < 6 µg/dL
- C. < 9 µg/dL
- D. < 12 µg/dL

Relative adrenal insufficiency is defined as a <9 µg/dL increment between peak & baseline cortisol levels following administration of 250 µg of cosyntropin as an IV bolus.

536 What value of a random cortisol level is indicative of relative adrenal insufficiency ?

Harrison's 17th Ed. 2266

- A. ≤ 5 µg/dL
- B. ≤ 10 µg/dL
- C. ≤ 15 µg/dL
- D. ≤ 20 µg/dL

537 What value of a random cortisol level excludes the diagnosis of relative adrenal insufficiency ?

Harrison's 17th Ed. 2266

- A. > 24 µg/dL
- B. > 34 µg/dL
- C. > 44 µg/dL
- D. > 54 µg/dL

A random cortisol level of ≤15 µg/dL is indicative of relative adrenal insufficiency and a random cortisol level >34 µg/dL usually excludes the diagnosis of relative adrenal insufficiency.

538 Isolated aldosterone deficiency occurs in ?*Harrison's 17th Ed. 2266*

- A. Protracted heparin administration
- B. Pretectal disease of nervous system
- C. Severe postural hypotension
- D. ALI of the above

Isolated aldosterone deficiency with normal cortisol production occurs in hyporeninism, as an inherited biosynthetic defect, following removal of aldosterone-secreting adenomas, during protracted heparin therapy, in pretectal disease of CNS, and in severe postural hypotension.

539 The most common form of CAH is due to impairment of ?*Harrison's 17th Ed. 2267*

- A. 17-hydroxylase/17,20-lyase (CYP17)
- B. 21-hydroxylase (CYP21A2)
- C. 11 β -hydroxylase (CYP11B1)
- D. 3 β -HSD2

The most common form of CAH (95% of cases) is a result of impairment of CYP21A2.

540 CAH caused by deficiency of 21-hydroxylase is characterised by ?*Lancet 2005; 365: 2125–36*

- A. Cortisol deficiency
- B. With or without aldosterone deficiency
- C. Androgen excess
- D. All of the above

CAH caused by deficiency of 21-hydroxylase is characterised by cortisol deficiency, with or without aldosterone deficiency, and androgen excess.

541 The highest rates of classic CAH occur in ?*Lancet 2005; 365: 2125–36*

- A. Alaska
- B. Brazil
- C. Philippines
- D. USA

The highest rates of classic CAH occur in two geographically isolated populations - Yupic Eskimos of Alaska (one in 280) & French island of La Réunion (one in 2100). High rates have also been reported in Brazil (one in 7500) and the Philippines (one in 7000).

542 The 21-hydroxylase gene is located on chromosome ?*Lancet 2005; 365: 2125–36*

- A. 6
- B. 8
- C. 10
- D. 12

21-hydroxylase gene is located on chromosome 6p21:3 within HLA histocompatibility complex. There are two highly homologous 21-hydroxylase genes resulting from ancestral duplication : an active gene, CYP21A2 (CYP21B) & an inactive pseudogene CYP21A1P (CYP21A, CYP21P).

543 A very high concentration of which of the following is diagnostic of classic 21-hydroxylase deficiency ?*Lancet 2005; 365: 2125–36*

- A. Androstenedione
- B. 11-deoxycortisol
- C. 17-hydroxyprogesterone
- D. Pregnenolone

A very high concentration of 17-hydroxyprogesterone (>242 nmol/L; normal < 3 nmol/L at 3 days in full-term infant) in a randomly timed blood sample is diagnostic of classic 21-hydroxylase deficiency.

544 What value of stimulated concentration of 17-hydroxyprogesterone is diagnostic of 21-hydroxylase deficiency ?*Lancet 2005; 365: 2125–36*

- A. > 15 nmol/L
- B. > 25 nmol/L
- C. > 35 nmol/L
- D. > 45 nmol/L

A corticotropin stimulated concentration of 17-hydroxyprogesterone higher than 45 nmol/L is diagnostic of 21-hydroxylase deficiency.

545 “Hypertensive” variant of Congenital adrenal hyperplasia (CAH) is due to deficiency of ?*Harrison's 17th Ed. 2267*

- A. 21-hydroxylase (CYP21A2)
- B. 17-hydroxylase/17,20-lyase (CYP17)
- C. 11 β -hydroxylase (CYP11B1)
- D. 3 β -HSD2

CYP11B1 deficiency causes a “hypertensive” variant of CAH. Hypertension & hypokalemia occur because of impaired conversion of 11-deoxycorticosterone to corticosterone, resulting in the accumulation of 11-deoxycorticosterone, a potent mineralocorticoid.

546 CYP17 deficiency is characterized by ?*Harrison's 17th Ed. 2267*

- A. Hypogonadism
- B. Hypokalemia
- C. Hypertension
- D. All of the above

CYP17 deficiency is characterized by hypogonadism, hypokalemia, and hypertension. It causes decreased production of cortisol & shunting of precursors into the mineralocorticoid pathway with hypokalemic alkalosis, hypertension, and suppressed plasma renin activity.

547 In CAH, prednisone is the drug of choice in all except ?*Harrison's 17th Ed. 2267*

- A. Infants
- B. Children
- C. Adolescents
- D. Adults

Therapy in CAH is daily administration of glucocorticoids to suppress pituitary ACTH secretion. Prednisone is the drug of choice except in infants, in whom hydrocortisone is usually used.

548 Which of the following has the longest half-life ?*Harrison's 17th Ed. 2269 Table 336-11*

- A. Prednisone
- B. Prednisolone
- C. Methylprednisolone
- D. Triamcinolone

Chapter 343. Pheochromocytoma

549 In pheochromocytoma, mean age at diagnosis is about ?*Harrison's 18th Ed. 2962*

- A. 20 years
- B. 30 years
- C. 40 years
- D. 50 years

In pheochromocytoma, mean age at diagnosis is about 40 years, although the tumors can occur from early childhood until late in life.

550 The "rule of tens" for pheochromocytomas states ?

Harrison's 18th Ed. 2962

- A. ~ 10 % are bilateral
- B. ~ 10 % are extraadrenal
- C. ~ 10 % are malignant
- D. All of the above

The "rule of tens" for pheochromocytomas states that ~10% are bilateral, 10% are extraadrenal & 10% are malignant. These percentages are higher in the inherited syndromes.

551 Which of the following about paraganglioma is false ?

Harrison's 18th Ed. 2962

- A. Catecholamine-producing tumors in head & neck
- B. Tumors arising from parasympathetic nervous system
- C. Unknown etiology
- D. None of the above

Paraganglioma refers to catecholamine-producing tumors in head & neck, as well as tumors that arise from parasympathetic nervous system, which may secrete little or no catecholamines. Etiology of most sporadic pheochromocytomas & paragangliomas is unknown.

552 Germ-line mutations in which of the following can cause inherited pheochromocytoma ?

Harrison's 18th Ed. 2962

- A. RET
- B. VHL
- C. NF1
- D. All of the above

~25% of patients of pheochromocytoma are inherited due to germ-line mutations in the RET, VHL, NF1, SDHB, SDHC, or SDHD genes.

553 The VHL protein is a component of ?

Harrison's 18th Ed. 2962

- A. Ubiquitin E3 ligase
- B. Mitochondrial kinase
- C. Cytosolic kinase
- D. All of the above

The VHL protein is a component of a ubiquitin E3 ligase.

554 Which of the following diseases is related to E3 ubiquitin protein ligase ?

Harrison's 18th Ed. 3320

- A. Hallervorden-Spatz disease
- B. Wilson's disease
- C. Parkinson's Disease
- D. Frontotemporal dementia

PARK2 encodes parkin, an E3 ubiquitin protein ligase. Mutations in parkin appear to be the major cause of autosomal recessive Parkinson's disease.

555 Classic triad of pheochromocytoma consists of all except ?

Harrison's 18th Ed. 2962

- A. Palpitation
- B. Hypertension
- C. Headache
- D. Profuse sweating

Classic triad of pheochromocytoma consists of episodes of palpitations, headaches & profuse sweating. Association with episodic or sustained hypertension, makes pheochromocytoma a likely diagnosis.

556 In pheochromocytoma, which of the following is the most common symptom ?

Lancet 2005;366:665-675

- A. Sustained hypertension
- B. Paroxysmal hypertension
- C. Orthostatic hypotension
- D. Flushing

557 In pheochromocytoma, which of the following is the least common symptom ?

Lancet 2005;366:665-675

- A. Palpitations
- B. Sweating
- C. Headache
- D. Anxiety

558 Paroxysmal attacks in pheochromocytoma generally last for ?

Harrison's 18th Ed. 2962

- A. < 1 hour
- B. < 3 hour
- C. < 6 hour
- D. < 12 hour

Paroxysmal attacks in pheochromocytoma generally last less than an hour.

559 Paroxysmal attack in pheochromocytoma is precipitated by ?

Harrison's 18th Ed. 2962

- A. Positional changes
- B. Exercise
- C. Pregnancy
- D. All of the above

Paroxysmal attacks in pheochromocytoma are precipitated by surgery, positional changes, exercise, pregnancy, urination (bladder pheochromocytomas) & medications (tricyclic antidepressants, opiates, metoclopramide).

560 Drugs that can induce paroxysmal attacks in pheochromocytoma include ?

Harrison's 18th Ed. 2963

- A. Opiates
- B. Histamine
- C. Adrenocorticotropin
- D. All of the above

561 Drugs that can induce paroxysmal attacks in pheochromocytoma include ?

Harrison's 18th Ed. 2963

- A. Glucagon
- B. IV Methylidopa
- C. Tricyclic antidepressants
- D. All of the above

562 Which of the following is secreted most by pheochromocytoma ?

Harrison's 18th Ed. 2963

- A. Norepinephrine
- B. Epinephrine
- C. Dopamine

- D. Homovanillic acid (HVA)

Pheochromocytomas & paragangliomas synthesize & store catecholamines (norepinephrine, epinephrine & dopamine). Epinephrine is virtually never increased in extraadrenal pheochromocytomas.

563 Plasma and urinary metanephrine measure which metabolite of catecholamines ?

Harrison's 18th Ed. 2963

- A. E-methylated metabolites
B. S-methylated metabolites
C. L-methylated metabolites
D. O-methylated metabolites

564 Medication that increase catecholamines is ?

Harrison's 18th Ed. 2963

- A. Levodopa
B. Labetalol
C. Sympathomimetics
D. All of the above

Medications that increase catecholamines are levodopa, labetalol & sympathomimetics.

565 Plasma test for pheochromocytoma is estimation of ?

Harrison's 17th Ed. 2271

- A. Catecholamines
B. Metanephrines
C. Chromagranin A
D. All of the above

Plasma tests for pheochromocytoma include estimation of catecholamines, metanephrines & chromagranin A, a secretory product of endocrine cells.

566 Urinary test for pheochromocytoma is estimation of ?

Harrison's 18th Ed. 2963 Table 343-2

- A. Urinary VMA
B. Metanephrines
C. Catecholamines
D. All of the above

Urinary tests for VMA, metanephrines & catecholamines are commonly used for initial testing. Fractionated metanephrines & catecholamines are the most sensitive of these.

567 Upper limit of normal for total urinary catecholamines is ?

Harrison's 16th Ed. 2150

- A. 10 and 50 µg/day
B. 50 and 100 µg/day
C. 100 and 150 µg/day
D. 150 and 250 µg/day

568 False-positive increases in catecholamine excretion result from ?

Harrison's 16th Ed. 2150

- A. Methyl dopa
B. Levodopa
C. Labetalol
D. All of the above

569 Upper limit of normal of VMA excretion per day is ?

Harrison's 16th Ed. 2150

- A. 2 mg

- B. 5 mg

- C. 7 mg

- D. 9 mg

570 Upper limit of normal of total metanephrine excretion per day is ?

Harrison's 16th Ed. 2150

- A. 0.3 mg
B. 1.3 mg
C. 2.3 mg
D. 3.3 mg

571 Which out of the following has maximum sensitivity in the diagnosis of pheochromocytoma ?

Lancet 2005;366:665-675

- A. Plasma-free metanephrines
B. Plasma catecholamines
C. Urinary-fractionated metanephrines
D. VMA

572 Which out of the following has maximum specificity in the diagnosis of pheochromocytoma ?

Lancet 2005;366:665-675

- A. Plasma-free metanephrines
B. Plasma catecholamines
C. Urinary-fractionated metanephrines
D. VMA

573 Radioactive tracer used to localize phaeochromocytomas is ?

Harrison's 18th Ed. 2963

- A. ¹³¹I- or ¹²³I-metaiodobenzylguanidine (MIBG)
B. ¹¹¹In-somatostatin analogues
C. ¹⁸F-dopa (or dopamine)
D. All of the above

phaeochromocytoma tumor can be localized by radioactive tracers like ¹³¹I- or ¹²³I-metaiodobenzylguanidine (MIBG), ¹¹¹In-somatostatin analogues, or ¹⁸F-dopa (or dopamine) positron-emission tomography (PET). ¹³¹I-MIBG is also used in treatment of malignant phaeochromocytoma using 200-mCi doses at monthly intervals, over three to six cycles.

574 Which of the following provides better diagnostic sensitivity in the diagnosis of phaeochromocytomas ?

Lancet 2005;366:665-675

- A. CT
B. MRI
C. ¹⁸F-fluorodopamine PET
D. ¹³¹I-MIBG

575 Which of the following is an α-adrenoceptor blocker ?

Lancet 2005;366:665-675

- A. Prazosin
B. Doxazosin
C. Urapidil
D. All of the above

α-adrenoceptor blockers are phenoxybenzamine, prazosin, doxazosin & urapidil.

576 In pheochromocytoma, phenoxybenzamine should be administered for at least how many days prior to surgery ?

Harrison's 17th Ed. 2271

A. 2 to 5 days

B. 5 to 10 days

C. 10 to 14 days

D. 14 to 21 days

Adequate alpha adrenergic blockade with phenoxybenzamine generally requires 10 - 14 days, with a typical final dose of 20 - 30 mg three times per day.

577

Malignant pheochromocytoma can metastasize to ?

Lancet 2005;366:665-675, Harrison's 18th Ed. 2964

A. Bones

B. Lungs

C. Liver

D. All of the above

Term malignant pheochromocytoma is restricted to tumors with distant metastases, most commonly to lungs, bone or liver, suggesting a vascular pathway of spread.

578

Which of the following features of pheochromocytoma have a higher risk for malignant disease ?

Lancet 2005;366:665-675

A. Large size (5 cm)

B. Parangliomas with SDHB mutations

C. Increased plasma/urinary dopamine and dopa

D. All of the above

579

Averbuch's chemotherapy protocol for treatment of malignant pheochromocytoma consists of all except ?

Harrison's 18th Ed. 2964

A. Dacarbazine

B. Methotrexate

C. Cyclophosphamide

D. Vincristine

Averbuch's chemotherapy protocol includes dacarbazine, cyclophosphamide, and vincristine, repeated every 21 days for three to six cycles.

580

Classic features of neurofibromatosis include ?

Harrison's 18th Ed. 2964

A. Café au lait spots

B. Axillary freckling of skin

C. Lisch nodules of iris

D. All of the above

Classic features of Neurofibromatosis type 1 (NF 1) or Von Recklinghausen's Disease include multiple benign Schwann cell neurofibromas, pigmented café au lait macules (CALM), freckling of non-sun-exposed skin of axilla, Lisch nodules of iris and pseudoarthrosis of the tibia.

581

Lisch nodules of iris best relates to which of the following ?

Harrison's 18th Ed. 2964

A. Pigmentation

B. Hamartoma

C. Prolapse

D. Dysplasia

Lisch nodules refers to hamartomas of the iris.

582

NF1 gene that causes von Recklinghausen's disease is on which chromosome ?

Harrison's 17th Ed. 2272

A. 6

B. 12

C. 17

D. 18

NF1 gene on chromosome 17 causes von Recklinghausen's disease. NF1 gene is a tumor-suppressor gene & encodes a neurofibromin which modulates signal transduction through the ras GTPase pathway.

583

Sipple's syndrome is also called ?

Harrison's 16th Ed. 2149

A. MEN type 1A

B. MEN type 1B

C. MEN type 2A

D. MEN type 2B

584

Multiple endocrine neoplasia type 2A is characterized by ?

Harrison's 18th Ed. 2964

A. Medullary thyroid carcinoma (MTC)

B. Pheochromocytoma

C. Hyperparathyroidism

D. All of the above

MEN 2A is characterized by MTC, pheochromocytoma & hyperparathyroidism.

585

Multiple endocrine neoplasia type 2B is characterized by ?

Harrison's 18th Ed. 2964

A. Medullary thyroid carcinoma (MTC)

B. Pheochromocytoma

C. Multiple mucosal neuromas

D. All of the above

MEN 2B includes MTC, pheochromocytoma & multiple mucosal neuromas. It typically lacks hyperparathyroidism. Both types of MEN 2 are caused by mutations in RET (rearranged in transfection) that encodes a tyrosine kinase.

586

Which of the following is not a feature of pheochromocytomas in MEN 2 ?

Harrison's 18th Ed. 2964

A. Benign

B. Located in adrenals

C. MTC may be symptomatic before pheochromocytoma

D. Bilateral

Pheochromocytomas in MEN 2 are benign, located in the adrenals, and bilateral. Pheochromocytoma may be symptomatic before MTC.

587

Which of the following is not a feature of Von Hippel-Lindau syndrome ?

Harrison's 18th Ed. 2965, Lancet 2005;366:665-675

A. Renal clear-cell carcinoma

B. Retinal hemangioblastoma

C. Testicular tumour

D. Pancreatic islet cell tumour

VHL is an autosomal dominant disorder that predisposes to retinal & cerebellar hemangioblastomas, which also occur in the brain stem & spinal cord. Other features of VHL are clear cell renal carcinomas, pancreatic islet cell tumors, endolymphatic sac tumors (ELSTs) of the inner ear, cystadenomas of the epididymis & broad ligament, and multiple pancreatic or renal cysts.

588

VHL gene encodes an E3 ubiquitin ligase that regulates expression of ?

Harrison's 18th Ed. 2965

A. Insulin-like growth factor (IGF) I

- B. Basic fibroblast growth factor (bFGF)
- C. Tissue-specific transcription factor
- D. Hypoxia-inducible factor-1 (HIF-1)

VHL gene encodes an E3 ubiquitin ligase that regulates expression of hypoxia-inducible factor-1 (HIF-1). Loss of VHL is associated with increased expression of vascular endothelial growth factor (VEGF), which induces angiogenesis.

589 Type of mutation in VHL gene in pheochromocytoma is ?

Harrison's 18th Ed. 2965

- A. Point
- B. Missense
- C. Transition
- D. Frameshift

Patients with pheochromocytoma predominantly have missense mutations in VHL gene. Mutations involving single nucleotides are referred to as point mutations. Substitutions are called transitions if a purine or pyrimidine is replaced by another purine or pyrimidine base. Changes from a purine to a pyrimidine, or vice versa, are called transversions. If the DNA sequence change occurs in a coding region and alters an amino acid, it is called a missense mutation. Polymorphisms are sequence variations that have a frequency of at least 1%. Small nucleotide deletions or insertions cause a shift of the codon reading frame (frameshift). Most commonly, reading frame alterations result in an abnormal protein segment of variable length before termination of translation occurs at a stop codon (nonsense mutation).

590 Mutations of which of the following gene causes paraganglioma syndrome 1 (PGL1) ?

Harrison's 18th Ed. 2965

- A. SDHA
- B. SDHB
- C. SDHC
- D. SDHD

Succinate dehydrogenase (SDH) is formed by four subunits (A - D). Mutations of SDHB (PGL4), SDHC (PGL3), and SDHD (PGL1) predispose to three of the paraganglioma syndromes.

591 Mutations of which of the following do not predispose to paraganglioma tumors ?

Harrison's 18th Ed. 2965

- A. SDHA
- B. SDHB
- C. SDHC
- D. SDHD

Mutations of SDHA do not predispose to paraganglioma tumors but cause Leigh disease, a form of encephalopathy.

592 Which is most frequent paraganglioma syndrome ?

Harrison's 18th Ed. 2965

- A. PGL1
- B. PGL2
- C. PGL3
- D. PGL4

PGL1 is most frequent, followed by PGL4. PGL3 is rare. Adrenal, extraadrenal abdominal & thoracic pheochromocytomas are components of PGL1 & PGL4, but not of PGL3.

593 Abdominal extraadrenal pheochromocytoma are located in association with ?

Harrison's 16th Ed. 2148

- A. Celiac ganglia
- B. Superior mesenteric ganglia
- C. Inferior mesenteric ganglia
- D. All of the above

594 Hereditary phaeochromocytomas occur in ?

Harrison's 16th Ed. 2148

- A. MEN type 2
- B. Von Hippel-Lindau syndrome
- C. Neurofibromatosis type 1
- D. All of the above

595 Which of the following is false about pheochromocytoma ?

Harrison's 16th Ed. 2148

- A. Solitary lesions are right sided
- B. Highly vascular
- C. Tumors are not innervated
- D. None of the above

596 Features that suggest familial pheochromocytoma include ?

Harrison's 16th Ed. 2149

- A. Bilaterality
- B. Multicentricity
- C. Age of onset < 30 years
- D. All of the above

597 Which of the following is a hypotensive peptide ?

Harrison's 16th Ed. 2149

- A. Endothelin
- B. Adrenomedullin
- C. Erythropoietin
- D. Neuropeptide Y

598 In pheochromocytoma, elevated level of amylase is due to ?

Harrison's 16th Ed. 2150

- A. Damaged pulmonary endothelium
- B. Associated pancreatitis
- C. Sialolithiasis
- D. All of the above

599 To assess adequacy of collected urine sample, which of the following should also be determined ?

Harrison's 16th Ed. 2150

- A. Urea
- B. Creatinine
- C. Sodium
- D. Potassium

600 Which of the following may cause hypertension & increased excretion of catecholamines/catecholamine metabolites ?

Harrison's 16th Ed. 2151

- A. Posterior fossa tumors
- B. Subarachnoid hemorrhage
- C. Diencephalic or autonomic epilepsy
- D. All of the above

601 Which of the following statements is false ?

Harrison's 16th Ed. 2069

- A. ACTH receptors are located exclusively in adrenal cortex
- B. FSH receptors are found only in gonads
- C. Insulin & thyroid hormone receptors are widely distributed
- D. None of the above

- 602 Which of the following drugs block catecholamine synthesis ?**
Lancet 2005;366:665-675
- Doxazosin
 - Methyl-paratyrosine (metirosine)
 - Phenoxybenzamine
 - All of the above
- 603 Which of the following hormones is proteolytically derived from larger precursor polypeptides ?**
Harrison's 16th Ed. 2068
- PTH
 - Glucagon
 - Insulin
 - All of the above
- 604 In WDHA syndrome, 'W' stands for ?**
Harrison's 16th Ed. 2228
- Weight loss
 - Wasting
 - Watery
 - Weakness
- 605 Which of the following is a part of WDHA syndrome ?**
Harrison's 16th Ed. 2228
- Weight loss
 - Dementia
 - Hypokalemia
 - Alkalosis
- 606 Which of the following is not caused by 'VIP' hormone ?**
Harrison's 16th Ed. 2228
- Small-intestinal chloride secretion
 - Inhibition of acid secretion
 - Skeletal muscle excitability
 - Vasodilatory effects
- 607 Which of the following regarding VIPoma's is false ?**
Harrison's 16th Ed. 2228
- Also called Verner-Morrison syndrome
 - Stool volume of < 700 mL/day rules out VIPoma
 - Hyperglycemia & hypercalcemia frequent
 - None of the above
- 608 Diseases that cause secretory large-volume diarrhea include all except ?**
Harrison's 16th Ed. 2229
- Gastrinomas
 - GRFomas
 - Carcinoid syndrome
 - Systemic mastocytosis
- 609 Nonfunctional pancreatic endocrine tumours secrete all except ?**
Harrison's 16th Ed. 2229
- Chromogranin A
 - Chromogranin B
 - α -human chorionic gonadotropin
 - VIP
- 610 GRFomas are found as ?**
Harrison's 16th Ed. 2229
- Pancreatic endocrine tumour
 - Lung tumour
 - Small intestinal carcinoids
 - All of the above
- 611 Which of the following is false about MEN1 ?**
Harrison's 16th Ed. 2231
- Also called Wermer's syndrome
 - Autosomal recessive
 - Neoplasia of parathyroid, pituitary & pancreatic islet
 - Hyperparathyroidism is most common manifestation
- 612 Which of the following is false about MEN1 ?**
Harrison's 16th Ed. 2231
- Increased urine calcium excretion
 - Serum calcium rarely elevated at birth
 - Parathyroid hyperplasia
 - None of the above
- 613 Tumor-suppressor protein encoded by MEN1 gene is ?**
Harrison's 16th Ed. 2232
- Henin
 - Menin
 - Tenin
 - Senin
- 614 'Pancreatic cholera' is due to overproduction of ?**
Harrison's 16th Ed. 2232
- VIP
 - Gastrin
 - Ghrelin
 - Glucagon
- 615 Which of the following hormones is most commonly produced by pituitary tumors in MEN1 ?**
Harrison's 16th Ed. 2233
- GH
 - Prolactin
 - ACTH
 - TSH
- 616 Mutations of which of the following genes occurs in MEN2 ?**
Harrison's 16th Ed. 2234
- TERC
 - SPINK5
 - TRIM37
 - RET
- 617 Which of the following is not a feature of MEN type 2A ?**
Harrison's 16th Ed. 2233
- Medullary thyroid carcinoma (MTC)
 - Pheochromocytoma
 - Mucosal neuromas
 - Hyperparathyroidism

618 Which of the following is not a feature of MEN type 2B ?

Harrison's 16th Ed. 2233

- A. Medullary thyroid carcinoma (MTC)
- B. Pheochromocytoma
- C. Mucosal neuromas
- D. Hyperparathyroidism

619 Subvariant of MEN2A include ?

Harrison's 16th Ed. 2233

- A. Familial medullary thyroid carcinoma (FMTc)
- B. Cutaneous lichen amyloidosis
- C. Hirschsprung disease
- D. All of the above

Chapter 344. Diabetes Mellitus

620 Most recent classification of diabetes mellitus is based on ?

Harrison's 18th Ed. 2968

- A. Pathogenic process leading to hyperglycemia
- B. Age of onset
- C. Type of therapy
- D. All of the above

"Pathogenic process leading to hyperglycemia" is the basis of classification of DM, as opposed to earlier criteria such as age of onset or type of therapy.

621 Type of diabetes mellitus resulting from autoimmune beta cell destruction is ?

Harrison's 18th Ed. 2969 Table 344-1

- A. Type IA
- B. Type IB
- C. Type II
- D. All of the above

Type 1A DM results from autoimmune beta cell destruction causing insulin deficiency. Individuals with type 1B DM lack immunologic markers indicative of an autoimmune destructive process of beta cells. They develop insulin deficiency by unknown mechanisms & are ketosis prone.

622 Type 2 diabetes mellitus is characterized by all except ?

Harrison's 18th Ed. 2968

- A. Insulin resistance
- B. Impaired insulin secretion
- C. Increased glucose production
- D. Anti-insulin receptor antibodies

Type 2 DM is a heterogeneous group of disorders characterized by variable degrees of insulin resistance, impaired insulin secretion, and increased glucose production.

623 Maturity onset diabetes of the young (MODY) is characterized by all except ?

Harrison's 18th Ed. 2968

- A. Autosomal dominant inheritance
- B. Autosomal recessive inheritance
- C. Early onset hyperglycemia
- D. Impairment of insulin secretion

Maturity onset diabetes of the young (MODY) is characterized by autosomal dominant inheritance, early onset of hyperglycemia, and impairment in insulin secretion.

624 All of the following viruses can cause DM except ?

Harrison's 18th Ed. 2969 Table 344-1

- A. Congenital Rubella
- B. CMV
- C. EBV
- D. Coxsackie

Viral infections like congenital rubella, cytomegalovirus and coxsackie have been implicated in pancreatic islet destruction.

625 All of the following drugs can cause DM except ?

Harrison's 18th Ed. 2969 Table 344-1

- A. Diazoxide
- B. Pyrantel pamoate
- C. Pentamidine
- D. Phenytoin

626 Drugs that can cause DM include ?

Harrison's 18th Ed. 2969 Table 344-1

- A. Nicotinic acid
- B. Thyroid hormone
- C. Beta-adrenergic agonists
- D. All of the above

627 Drugs that can cause DM include ?

Harrison's 18th Ed. 2969 Table 344-1

- A. Thiazides
- B. Phenytoin
- C. Beta blockers
- D. All of the above

628 Drugs that can cause DM include ?

Harrison's 18th Ed. 2969 Table 344-1

- A. Alpha-interferon
- B. Protease inhibitors
- C. Clozapine
- D. All of the above

Drugs that can cause DM include pentamidine, nicotinic acid, glucocorticoids, thyroid hormone, diazoxide, β -adrenergic agonists, thiazides, phenytoin, α -interferon, protease inhibitors, clozapine & vacor.

629 Syndromes associated with DM are all except ?

Harrison's 18th Ed. 2969 Table 344-1

- A. Down syndrome
- B. Klinefelter syndrome
- C. Turner syndrome
- D. Cri-du-chat syndrome

Genetic syndromes associated with diabetes are Wolfram's syndrome, Down's syndrome, Klinefelter's syndrome, Turner's syndrome, Friedreich's ataxia, Huntington's chorea, Laurence-Moon-Biedl syndrome, myotonic dystrophy, porphyria, Prader-Willi syndrome.

630 Out of the following countries, which one has the highest incidence of type 1 DM ?

Harrison's 18th Ed. 2969

- A. Japan
- B. China
- C. Scandinavia

- D. United States of America

Scandinavia has the highest incidence of type 1 DM. US, Japan and China have a lower rate.

631 In the ADA criteria for diagnosis of DM, what is meant by “fasting state” ?

Harrison's 18th Ed. 2970 Table 344-2

- A. No oral intake since last 8 hours
- B. No oral intake for last 12 hours
- C. No caloric intake for last 8 hours
- D. No caloric intake for last 12 hours

Fasting state is defined as no “caloric” intake for at least 8 hours.

632 After 2 hours of 75-gram oral glucose load, impaired glucose tolerance is defined when plasma glucose levels are between ?

Harrison's 18th Ed. 2970

- A. 100 & 180 mg/dL
- B. 126 & 180 mg/dL
- C. 140 & 199 mg/dL
- D. 160 & 200 mg/dL

Impaired glucose tolerance (IGT) is defined as plasma glucose levels between 140 and 199 mg/dL, 2 hours after a 75-gram oral glucose load.

633 After 2 hours of 75-gram oral glucose load, impaired fasting glucose is defined when fasting plasma glucose level are between ?

Harrison's 18th Ed. 2970

- A. 80 & 125 mg/dL
- B. 100 & 125 mg/dL
- C. 125 & 180 mg/dL
- D. 125 & 200 mg/dL

Impaired fasting glucose (IFG) is defined when fasting plasma glucose level are between 100 to 125 mg/dL.

634 Individuals with impaired fasting glucose are at increased risk of developing which of the following condition ?

Harrison's 18th Ed. 2970

- A. Neuropathy
- B. Arthropathy
- C. Cardiovascular diseases
- D. Renal failure

635 Individuals with impaired fasting glucose (IFG) are at increased risk of developing ?

Harrison's 18th Ed. 2970

- A. Type 1 DM
- B. Type 2 DM
- C. Pancreatitis
- D. Hypothyroidism

Individuals with IFG or IGT are at substantial risk for developing type 2 DM & cardiovascular disease.

636 American Diabetes Association (ADA) recommends screening for DM in which of the following ?

Harrison's 18th Ed. 2971

- A. >35 yrs - every three years
- B. >40 yrs - every three years

- C. >45 yrs - every three years

- D. >50 yrs - every year

American Diabetes Association (ADA) recommends screening all individuals >45 years every 3 years.

637 86-amino-acid precursor polypeptide of insulin is called ?

Harrison's 18th Ed. 2971

- A. C-peptide
- B. Preinsulin
- C. Proinsulin
- D. Preproinsulin

Insulin is initially synthesized as a single-chain 86-amino-acid precursor polypeptide, preproinsulin.

638 Proteolytic processing of “preproinsulin” results in the formation of ?

Harrison's 18th Ed. 2971

- A. C peptide
- B. Proinsulin
- C. Insulin
- D. All of the above

Proteolytic processing of “preproinsulin” removes aminoterminal signal peptide, giving rise to proinsulin.

639 Which of the following is structurally related to insulin-like growth factors I and II ?

Harrison's 18th Ed. 2971

- A. Preproinsulin
- B. Proinsulin
- C. Insulin
- D. Glucagon

Proinsulin is structurally related to insulin-like growth factors I and II.

640 Cleavage of proinsulin generates which of the following ?

Harrison's 18th Ed. 2971

- A. C peptide
- B. A chain of insulin
- C. B chain of insulin
- D. All of the above

Proinsulin cleavage generates C peptide and A and B chains of insulin.

641 The A and B chains of insulin contain how many amino acids respectively ?

Harrison's 18th Ed. 2971

- A. 21 & 30 amino acids
- B. 30 & 21 amino acids
- C. 21 & 29 amino acids
- D. 29 & 21 amino acids

642 The A and B chains of insulin are connected by which of the following bond ?

Harrison's 18th Ed. 2971

- A. Hydrogen
- B. Amino acid
- C. Disulfide
- D. Calcium

A & B chains of insulin contain 21 & 30 amino acids respectively. They are connected by disulfide bonds.

643 Insulin synthesis is stimulated by glucose levels above ?

Harrison's 18th Ed. 2971

- A. 30 mg%
- B. 40 mg%
- C. 50 mg%
- D. 70 mg%

Glucose levels > 70 mg/dL stimulate insulin synthesis by enhancing protein translation & processing.

644 Word insulin is derived from a Latin word "insula" meaning ?

Clinical Chemistry 2002;48:2270-2288

- A. Protected
- B. Projected
- C. Island
- D. High land

645 Frederick G. Banting, who discovered insulin was a ?

Clinical Chemistry 2002;48:2270-2288

- A. Physiologist
- B. Biochemist
- C. Orthopedic surgeon
- D. Physician

646 Glucose is transported into the pancreatic β cells via ?

Harrison's 18th Ed. 2971

- A. GLUT 1
- B. GLUT 2
- C. GLUT 3
- D. GLUT 4

Glucose is transported into the beta cell by the GLUT2 glucose transporter.

647 Which of the following acts as a rate-limiting step that controls glucose-regulated insulin secretion ?

Harrison's 18th Ed. 2971

- A. Pyruvate
- B. Glucose-6-phosphate
- C. Glucokinase
- D. All of the above

Glucose phosphorylation by "glucokinase" is the rate-limiting step that controls glucose-regulated insulin secretion.

648 Beta cell membrane depolarization that stimulates insulin secretion by opening calcium channels is done by ?

Harrison's 18th Ed. 2971

- A. Stimulation of ATP-sensitive K⁺ channel
- B. Inhibition of ATP-sensitive K⁺ channel
- C. Stimulation of ATP-sensitive Ca⁺⁺ channel
- D. Inhibition of ATP-sensitive Ca⁺⁺ channel

Metabolism of glucose-6-phosphate leads to inhibition of K⁺ channel inducing beta cell membrane depolarization which opens voltage-dependent calcium channels and causes insulin secretion.

649 What proportion of insulin in portal system is degraded by the liver ?

Harrison's 18th Ed. 2971

- A. 10 %
- B. 25 %

C. 50 %

D. 75 %

Once insulin is secreted into the portal venous system, ~50% is degraded by the liver.

650 Which of the following glucose transporters is crucial for glucose uptake by skeletal muscle and fat ?

Harrison's 18th Ed. 2972

- A. GLUT 1
- B. GLUT 2
- C. GLUT 3
- D. GLUT 4

Glucose transporter - GLUT4 is translocated to cell surface following activation of PI-3-kinase pathway which is stimulated by insulin. GLUT4 is crucial for glucose uptake by skeletal muscle & fat.

651 "SUR" stands for ?

Harrison's 18th Ed. 2971 Figure 344-4

- A. Sugar receptor
- B. Sulfonylurea receptor
- C. Sucrose receptor
- D. Sulphar receptor

SUR stands for sulfonylurea receptor & is the binding site for drugs that act as insulin secretagogues.

652 Major portion of postprandial glucose is utilized by ?

Harrison's 18th Ed. 2972

- A. Skeletal muscle
- B. Liver
- C. Adipose tissue
- D. Brain

Major portion of postprandial glucose is utilized by skeletal muscle through insulin-stimulation.

653 Which of the following is false about insulin secretion ?

Harrison's 18th Ed. 2971

- A. Secreted in a pulsatile pattern
- B. Meals induce large bursts of insulin secretion
- C. About 50% of secreted insulin is degraded by liver
- D. None of the above

654 All of the following are involved in insulin signal transduction in skeletal muscles except ?

Harrison's 18th Ed. 2972 Figure 344-5

- A. IRS proteins
- B. Shc proteins
- C. PI-3-kinase
- D. PAX-3

Insulin receptor has intrinsic tyrosine kinase activity & interacts with insulin receptor substrates (IRS & Shc) proteins. A number of "docking" proteins bind to these cellular proteins & initiate metabolic actions of insulin [GrB-2, SOS, SHP-2, p65, p110 & phosphatidylinositol-3'-kinase (PI-3-kinase)]. Insulin increases glucose transport through PI-3-kinase & Cbl pathway, which promotes translocation of intracellular vesicles containing GLUT4 glucose transporter to the plasma membrane.

655 Destruction of pancreatic beta cells in Type 1A DM develops as a result of which of the following ?

Harrison's 18th Ed. 2972

- A. Genetic factors
- B. Environmental factors
- C. Immunologic factors

- D. All of the above

Type 1A DM develops as a result of the synergistic effects of genetic, environmental, and immunologic factors that ultimately destroy the pancreatic beta cells.

656 What percentage of beta cell mass is destroyed when type 1 diabetes results ?

Harrison's 18th Ed. 2972 Figure 344-6

- A. 40 %
B. 60 %
C. 80 %
D. 100 %

Progressive impairment in insulin release due to gradual decline in beta cell mass results in type 1 diabetes when ~80% of the beta cell mass is destroyed.

657 In relation to type 1A DM, honeymoon period is ?

Harrison's 18th Ed. 2972

- A. Increased insulin requirement after marriage
B. Glycemic control achieved by OHA
C. Insulin requirement is nil or modest
D. Weight gain after insulin treatment

After the initial clinical presentation of type 1A DM, a "honeymoon" phase may ensue during which time glycemic control is achieved with modest doses of insulin or, rarely, insulin is not needed.

658 Major susceptibility gene for type 1 DM is on chromosome ?

Harrison's 18th Ed. 2973

- A. 1
B. 5
C. 6
D. 12

The major susceptibility gene for type 1A DM is located in the HLA region on chromosome 6.

659 Concordance of type 1A DM in identical twins ranges between ?

Harrison's 18th Ed. 2973

- A. 10 and 40%
B. 20 and 50%
C. 40 and 60%
D. 50 and 90%

The concordance of type 1A DM in identical twins ranges between 30 and 70%.

660 Glucagon is produced by ?

Harrison's 18th Ed. 2973

- A. Alpha cells
B. Beta cells
C. Delta cells
D. PP cells

661 Somatostatin is produced by ?

Harrison's 18th Ed. 2973

- A. Alpha cells
B. Beta cells
C. Delta cells
D. PP cells

662 Which of the following islet cell type is spared from the autoimmune process ?

Harrison's 18th Ed. 2973

- A. Alpha cells
B. Delta cells
C. PP cells
D. All of the above

Islet cell type alpha produces glucagon, delta produces somatostatin and PP produces pancreatic polypeptide. All these three though functionally and embryologically similar to beta cells and express most of the same proteins as beta cells, are spared from the autoimmune process.

663 In type 1A DM, after all beta cells are destroyed, which of the following statements is false ?

Harrison's 18th Ed. 2973

- A. Inflammatory process abates
B. Islets become atrophic
C. Immunologic markers disappear
D. None of the above

After all beta cells are destroyed in type 1A DM, the inflammatory process abates, the islets become atrophic, and immunologic markers disappear.

664 In pathogenesis of type 1 DM, all of the following are true except ?

Harrison's 18th Ed. 2973

- A. Pancreatic islets are infiltrated by lymphocytes
B. All islet cell types are involved
C. Release of $TNF\alpha$ & IL-1 play a role
D. Direct CD8+ mediated cytotoxicity

In type 1 DM, insulinitis occurs (lymphocytic infiltration of pancreatic islets). Beta cell death could be due to toxic effects of $TNF-\alpha$, interferon- γ and IL-1. Formation of nitric oxide metabolites, apoptosis & direct CD8+ T cell cytotoxicity may also contribute.

665 In pathogenesis of type 1 DM, islet destruction is mediated by ?

Harrison's 18th Ed. 2973

- A. T lymphocytes
B. B lymphocytes
C. Eosinophils
D. Neutrophils

In pathogenesis of type 1 DM, islet destruction is mediated by T lymphocytes rather than islet autoantibodies.

666 Pancreatic islet molecules targeted in autoimmune process in type 1A DM are all except ?

Harrison's 18th Ed. 2973

- A. Insulin
B. Glutamic acid decarboxylase (GAD)
C. Integrin
D. ZnT-8

Pancreatic islet molecules targeted by autoimmune process include insulin, glutamic acid decarboxylase (GAD), ICA-512/IA-2, and phogrin (insulin secretory granule protein). Pancreatic islet molecules targeted by the autoimmune process include insulin, glutamic acid decarboxylase (GAD), ICA-512/IA-2 (homology with tyrosine phosphatases), and a beta cell-specific zinc transporter (ZnT-8).

667 Which of the following autoantigens is not found in type 1 DM ?

Harrison's 18th Ed. 2973

- A. GAD-65
B. GLUR
C. IA-2 / ICA-512
D. Insulin

Islet cell autoantibodies (ICAs) are directed at pancreatic islet molecules such as GAD, insulin, IA-2/ICA-512. ICAs serve as a marker of autoimmune process of type 1A DM.

668 Haplotypes most strongly associated with type 1 DM include all except ?

Harrison's 18th Ed. 2973

- A. DQA1*0301
- B. DQA1*0102
- C. DQB1*0302
- D. DQB1*0201

*Haplotypes DQA1*0301, DQB1*0302 & DQB1*0201 are most strongly associated with type 1 DM.*

669 The strongest single association with type 1 DM is with which haplotype ?

Harrison's 18th Ed. 2973

- A. DQB1*0202
- B. DQB1*0302
- C. DQB1*0402
- D. DQB1*0602

*Haplotypes that carry a DQB1*0302 gene are strongly associated with type 1 diabetes.*

670 Presence of which haplotype in one individual confers the highest known genetic risk for type 1 diabetes mellitus ?

Harrison's 18th Ed. 2973

- A. DR3
- B. DR4
- C. Both DR3 & DR4
- D. None of the above

Most individuals with type 1A DM have the HLA DR3 and/or DR4 haplotype. Presence of both DR3 & DR4 haplotypes in one individual confers a 20-fold increased risk for type 1 diabetes

671 DQB1*0302 gene is associated with which haplotype ?

Harrison's 18th Ed. 2973

- A. DR3
- B. DR4
- C. Both DR3 & DR4
- D. None of the above

672 Which of the following gene is considered "protective" for type 1A diabetes mellitus ?

Harrison's 18th Ed. 2973

- A. DQB1*0302
- B. DQB1*0402
- C. DQB1*0502
- D. DQB1*0602

*Haplotype DQA1*0102, DQB1*0602 is extremely rare in individuals with type 1 DM & provide protection from type 1 DM. DQB1*0602 is considered "protective" for type 1 diabetes.*

673 Molecular mimicry between microbial proteins & host tissues has been reported in ?

Harrison's 17th Ed. 2071

- A. Type 1 diabetes mellitus
- B. Rheumatoid arthritis
- C. Multiple sclerosis
- D. All of the above

Molecular mimicry between microbial proteins & host tissues is reported in rheumatic fever, type 1 diabetes mellitus, rheumatoid arthritis & multiple sclerosis.

674 In type 2 DM, which of the following is true ?

Harrison's 18th Ed. 2974

- A. Insulin resistance precedes insulin secretory defects
- B. Insulin secretory defects precede insulin resistance
- C. Insulin resistance occur simultaneously with insulin secretory defects
- D. Any of the above

In type 2 DM, insulin resistance precedes insulin secretory defects and diabetes develops only if insulin secretion becomes inadequate.

675 Concordance of type 2 DM in identical twins is between ?

Harrison's 18th Ed. 2974

- A. 10 - 30 %
- B. 30 - 50 %
- C. 50 - 70 %
- D. 70 - 90 %

The concordance of type 2 DM in identical twins is between 70 and 90%.

676 If both parents have type 2 DM, risk of developing diabetes is ?

Harrison's 18th Ed. 2974

- A. ~ 10 %
- B. ~ 20 %
- C. ~ 30 %
- D. ~ 40 %

Individuals with both parents having type 2 DM, the risk approaches 40%.

677 Adipocytes secrete which of the following ?

Harrison's 18th Ed. 2974

- A. Leptin
- B. Resistin
- C. Adiponectin
- D. All of the above

Adipocytes secrete nonesterified free fatty acids, retinol-binding protein 4, leptin, TNF- α , resistin, and adiponectin).

678 In type 2 DM, increased fasting plasma glucose is predominantly due to ?

Harrison's 18th Ed. 2974

- A. Increased hepatic glucose output
- B. Decreased peripheral utilization of glucose
- C. Both of the above
- D. None of the above

679 In type 2 DM, increased postprandial plasma glucose is predominantly due to ?

Harrison's 18th Ed. 2974

- A. Increased hepatic glucose output
- B. Decreased peripheral utilization of glucose
- C. Both of the above
- D. None of the above

Increased hepatic glucose output predominantly accounts for increased FPG levels, whereas decreased peripheral glucose usage results in postprandial hyperglycemia.

680 Which of the following play predominant role in insulin resistance ?

Harrison's 18th Ed. 2974

- A. Prereceptor defects
- B. Receptor defects
- C. Postreceptor defects
- D. All of the above

Postreceptor defects play the predominant role in insulin resistance. Although insulin receptor levels and tyrosine kinase activity in skeletal muscle are reduced in T2DM, these are not a primary defect.

681 Elevated levels of free fatty acids can cause which of the following ?

Harrison's 18th Ed. 2974

- A. Impair glucose utilization in skeletal muscle
- B. Promote glucose production by liver
- C. Impair beta cell function
- D. All of the above

Elevated levels of free fatty acids can impair glucose utilization in skeletal muscle, promote glucose production by liver and impair beta cell function.

682 Other than insulin, β cells also secrete ?

Harrison's 18th Ed. 2975

- A. Ptyalin
- B. Amylin
- C. Amylase
- D. Lipase

Pancreatic beta cells cosecrete islet amyloid polypeptide (IAPP) or amylin along with insulin. It is a major component of amyloid fibrils found in islets of patients with type 2 diabetes. Its analogue is being used in treating both type 1 and type 2 DM.

683 "Glucose toxicity" refers to ?

Harrison's 18th Ed. 2975

- A. Acute hyperglycemia impairing islet function
- B. Chronic hyperglycemia impairing islet function
- C. Seizures in hyperglycemia
- D. All of the above

Chronic hyperglycemia paradoxically impairs islet function (glucose toxicity) and leads to a worsening of hyperglycemia.

684 All can cause islet cell dysfunction except ?

Harrison's 16th Ed. 2158

- A. Hyperglycemia
- B. Hypoglycemia
- C. Hyperlipidemia
- D. Islet cell autoantibodies

685 Which of the following can worsen islet function ?

Harrison's 18th Ed. 2975

- A. Chronic hyperglycemia
- B. Elevation of free fatty acid levels
- C. Dietary fat
- D. All of the above

Chronic hyperglycemia impairs islet function ("glucose toxicity") so does elevation of free fatty acid levels ("lipotoxicity") and dietary fat.

686 Which of the following is a feature of Polycystic ovary syndrome (PCOS) ?

Harrison's 18th Ed. 2975

- A. Affects premenopausal women
- B. Chronic anovulation
- C. Hyperandrogenism
- D. All of the above

PCOS affects premenopausal women & is characterized by chronic anovulation, hyperandrogenism with insulin resistance that increases the risk for type 2 DM, independent of the effects of obesity.

687 All are proved to delay or prevent DM except ?

Harrison's 16th Ed. 2158, Harrison's 17th Ed. 2282

- A. Life style modification
- B. Metformin
- C. Ramipril
- D. Atorvastatin

688 All are proved to delay or prevent DM except ?

Harrison's 16th Ed. 2158, Harrison's 17th Ed. 2282

- A. Acarbose
- B. Metformin
- C. NSAIDs
- D. Pravastatin

Diabetes Prevention Program (DPP) demonstrated that metformin prevented or delayed diabetes by 31% compared to placebo. Studies in Finnish and Chinese populations noted that acarbose, metformin, thiazolidinediones, and orlistat prevent or delay type 2 DM, but are not approved for this purpose. Ramipril and pravastatin reduced the number of new cases of diabetes.

689 All are risk factors for type 2 DM except ?

Harrison's 18th Ed. 2975

- A. Hypertension
- B. Acanthosis nigricans
- C. PCOD
- D. Ataxia telangiectasia

690 All of the following are true about MODY except ?

Harrison's 18th Ed. 2976

- A. Monogenic
- B. Autosomal dominant
- C. MODY 4 is due to mutation in IPF-1
- D. MODY 1 is due to mutation in glucokinase gene

MODY 2 is due to mutations in the glucokinase gene. MODY 4 is a rare variant caused by mutations in insulin promoter factor (IPF) 1. Six different variants of MODY have been identified so far, and all are transmitted as autosomal dominant disorders.

691 Hepatocyte nuclear transcription factor (HNF) is expressed in ?

Harrison's 18th Ed. 2976

- A. Liver
- B. Pancreatic islets
- C. Kidney
- D. All of the above

HNF are expressed in liver, pancreatic islets and kidney. Therefore, patients may also have renal absorption abnormalities and renal cysts.

692 MODY 1 is caused by mutations in ?

Harrison's 18th Ed. 2976

- A. HNF-4 alpha
- B. HNF-1 alpha
- C. HNF-1 beta
- D. All of the above

MODY 1, MODY 3, and MODY 5 are caused by mutations in the hepatocyte nuclear transcription factors (HNF) 4alpha, HNF-1alpha, and HNF-1beta, respectively.

693 Cerebral edema in DKA is seen most frequently in ?

Harrison's 18th Ed. 2976

- A. Children
- B. Adults
- C. Elderly
- D. All of the above

Cerebral edema, an extremely serious complication of DKA, is seen most frequently in children.

694 In liver, decreased ratio of insulin to glucagon promotes which of the following ?

Harrison's 18th Ed. 2977

- A. Gluconeogenesis
- B. Glycogenolysis
- C. Ketone body formation
- D. All of the above

The decreased ratio of insulin to glucagon promotes gluconeogenesis, glycogenolysis, and ketone body formation in liver.

695 Enzyme mediating increased ketone body formation in DKA is ?

Harrison's 18th Ed. 2977

- A. HMG CoA reductase
- B. CPT - I
- C. CPT - II
- D. Acyl CoA transferase

In DKA, hyperglucagonemia alters hepatic metabolism to favor ketone body formation, through activation of enzyme carnitine palmitoyltransferase I. This enzyme is crucial for regulating fatty acid transport into the mitochondria, where beta oxidation and conversion to ketone bodies occur.

696 In DKA, the elevated amylase is usually of which origin ?

Harrison's 18th Ed. 2977

- A. Salivary
- B. Gastric
- C. Pancreatic
- D. All of the above

In DKA the amylase is usually of salivary origin and thus is not diagnostic of pancreatitis.

697 In DKA, elevation in serum amylase is due to ?

Harrison's 16th Ed. 1897

- A. Acute pancreatitis
- B. Acidemia
- C. Infection
- D. All of the above

698 In DKA, interference from which of the following may falsely elevate serum creatinine measurement?

Harrison's 18th Ed. 2977

- A. Acetoacetate
- B. Hypertriglyceridemia

- C. Hyperglycemia
- D. Blood Urea

Interference from acetoacetate may falsely elevate the serum creatinine measurement in DKA.

699 For every 100 mg/dL rise in serum glucose, serum sodium is reduced by ?

Harrison's 18th Ed. 2977

- A. 1.0 meq/L
- B. 1.2 meq/L
- C. 1.4 meq/L
- D. 1.6 meq/L

For every 100 mg/dL rise in serum glucose, serum sodium is reduced by 1.6 mmol/L (1.6 meq).

700 Serum osmolality is calculated by which of the following formula ?

Harrison's 18th Ed. 2977

- A. $[2 \times (S. Na^+ + K^+) + P. glucose (mg/dL)]/18 + BUN/2.8]$
- B. $[3 \times (S. Na^+ + K^+) + P. glucose (mg/dL)]/18 + BUN/2.8]$
- C. $[4 \times (S. Na^+ + K^+) + P. glucose (mg/dL)]/18 + BUN/2.8]$
- D. $[4 \times (S. Na^+ + K^+) + P. glucose (mg/dL)]/18 + BUN/2.8]$

Serum osmolality is calculated by $[2 \times (serum sodium + serum potassium) + plasma glucose (mg/dL)]/18 + BUN/2.8]$

701 Which of the following is not a precipitating event in DKA ?

Harrison's 18th Ed. 2976 Table 344-5

- A. Cerebral infarction
- B. Cocaine
- C. Pregnancy
- D. Hypothyroidism

Precipitating events in DKA are inadequate insulin administration, infection, infarction (cerebral, coronary, mesenteric, peripheral), cocaine & pregnancy.

702 Nitroprusside reaction does not detect which of the following ?

Harrison's 17th Ed. 2284

- A. Acetoacetate
- B. Acetone
- C. Beta-hydroxybutyrate
- D. All of the above

Acetoacetate is preferentially detected by the commonly used nitroprusside ketosis detection reagent. Nitroprusside reaction only detects acetoacetate and acetone and not beta-hydroxybutyrate.

703 Which of the following drug may cause false-positive reactions in the nitroprusside test used to detect urine ketones ?

Harrison's 17th Ed. 2283

- A. Captopril
- B. Atorvastatin
- C. Aspirin
- D. All of the above

704 Which of the following drug may cause false-positive reactions in the nitroprusside test used to detect urine ketones ?

Harrison's 17th Ed. 2283

- A. Penicillamine
- B. Azithromycin

- C. Cephalosporin
- D. All of the above

Captopril or penicillamine may cause false-positive nitroprusside test used to detect urine ketones.

705 Which of the following intravenous solution is preferred for initial use in DKA to reduce hyperchloremia ?

Harrison's 18th Ed. 2978

- A. 0.45% saline
- B. Normal saline
- C. Lactated Ringer's IV solution
- D. Any of the above

Initial use of lactated Ringer's IV solution reduces hyperchloremia that occurs with normal saline.

706 In DKA, with insulin therapy, hyperglycemia improves due to ?

Harrison's 18th Ed. 2978

- A. Insulin-mediated glucose disposal
- B. Reduced hepatic glucose release
- C. Rehydration
- D. All of the above

Hyperglycemia usually improves at a rate of 75 to 100 mg/dL per hour as a result of insulin-mediated glucose disposal, reduced hepatic glucose release, and rehydration.

707 In DKA, following insulin therapy, the decline in plasma glucose within the first 1 to 2 hours is mostly related to ?

Harrison's 18th Ed. 2978

- A. Insulin-mediated glucose disposal
- B. Reduced hepatic glucose release
- C. Rehydration
- D. All of the above

The decline in the plasma glucose within the first 1 to 2 hours may be more rapid and is mostly related to volume expansion.

708 With insulin therapy in DKA, which of the following resolves first ?

Harrison's 18th Ed. 2978

- A. Acidosis
- B. Ketosis
- C. Hyperglycemia
- D. All of the above

In DKA, following insulin therapy, acidosis and ketosis resolve more slowly than hyperglycemia.

709 In DKA, which salt of potassium should be avoided for replacement ?

Harrison's 18th Ed. 2978

- A. Chloride
- B. Phosphate
- C. Acetate
- D. Any of the above

To reduce the amount of chloride administered, potassium phosphate or acetate can be substituted for the chloride salt.

710 In DKA, insulin should not be administered until potassium level is ?

Harrison's 18th Ed. 2978 Table 344-6

- A. > 3.0 meq/L

- B. > 3.1 meq/L
- C. > 3.2 meq/L
- D. > 3.3 meq/L

In DKA, insulin should not be administered until potassium level is >3.3 meq/L.

711 During treatment of DKA, very large changes occur in the serum levels of all except ?

Harrison's 18th Ed. 2976 Table 344-4

- A. Sodium
- B. Potassium
- C. Chloride
- D. Magnesium

712 Total-body stores which of the following elements is not reduced in DKA ?

Harrison's 18th Ed. 2976 Table 344-4

- A. Sodium
- B. Chloride
- C. Calcium
- D. Magnesium

Total-body stores of sodium, potassium, chloride, phosphorous & magnesium are reduced in DKA.

713 In treatment of DKA, glucose should be added to 0.45% saline infusion when plasma glucose level is around ?

Harrison's 18th Ed. 2978

- A. 100 mg/dL
- B. 150 mg/dL
- C. 200 mg/dL
- D. 250 mg/dL

When plasma glucose reaches 250 mg/dL, glucose should be added to 0.45% saline infusion to maintain plasma glucose in 200 to 250 mg/dL range & insulin infusion should be continued.

714 Which of the following drugs should be withheld well before intravenous contrast administration ?

Harrison's 17th Ed. 2300

- A. Pioglitazone
- B. Metformin
- C. Acarbose
- D. Glipizide

715 In hyperglycemic hyperosmolar state (HHS), the blood glucose level is usually above ?

Harrison's 18th Ed. 2976 Table 344-4

- A. 300 mg%
- B. 400 mg%
- C. 500 mg%
- D. 600 mg%

716 In HHS, moderate ketonuria, if present, is secondary to ?

Harrison's 18th Ed. 2979

- A. Starvation
- B. Infection
- C. Oliguria
- D. All of the above

In HHS, moderate ketonuria, if present, is secondary to starvation.

717 All are features of hyperglycemic hyperosmolar state except ?

Harrison's 18th Ed. 2976 Table 344-4

- A. Normal Na⁺, K⁺, Cl⁻
- B. Glucose between 600-1200 mg %
- C. Normal PCO₂
- D. pH < 7.3

In contrast to DKA, acidosis and ketonemia are absent or mild.

718 Which of the following symptom is absent in HHS ?

Harrison's 18th Ed. 2979

- A. Nausea, vomiting
- B. Abdominal pain
- C. Kussmaul respiration
- D. All of the above

In HHS, nausea, vomiting, abdominal pain & Kussmaul respirations characteristic of DKA are notably absent.

719 Which of the following statements is false ?

Harrison's 18th Ed. 2979

- A. Dehydration in HHS > DKA
- B. HHS patient is usually young
- C. Mortality higher in HHS than DKA
- D. None of the above

Typical patient of HHS is an elderly type 2 DM individual, with a several week history of polyuria, weight loss & diminished oral intake that culminates in mental confusion, lethargy, or coma. In HHS, fluid losses & dehydration are more pronounced than in DKA. HHS has a substantially higher mortality than DKA.

720 Which of the following is not a nonvascular chronic complication of DM ?

Harrison's 18th Ed. 2980 Table 344-7

- A. Macular edema
- B. Glaucoma
- C. Cataracts
- D. Periodontal disease

Macular edema is a microvascular chronic complication of diabetes mellitus.

721 The redox potential is zero for ?

- A. Oxygen
- B. Hydrogen
- C. Nitrogen
- D. Helium

The redox potential is a measure (in volts) of the affinity of a substance for electrons, its electronegativity compared with hydrogen (which is set at 0).

722 "AGE" stands for ?

Harrison's 18th Ed. 2980

- A. Activated glycosylation end products
- B. Anti glycosylation end products
- C. Advanced glycosylation end products
- D. Associated glycosylation end products

Increased intracellular glucose leads to the formation of advanced glycosylation end products (AGEs) via the nonenzymatic glycosylation of intra- and extracellular proteins.

723 Intracellular glucose is converted to sorbitol by which enzyme ?

Harrison's 18th Ed. 2980

- A. Aldose reductase

- B. Phosphofructokinase
- C. Fructose-1,6-bisphosphatase
- D. Phosphoenolpyruvate carboxykinase

Intracellular glucose is predominantly metabolized by phosphorylation and subsequent glycolysis, but when increased, some glucose is converted to sorbitol by the enzyme aldose reductase.

724 In the Diabetes Control and Complications Trial (DCCT), which of the following complication showed maximum reduction with improved glycemic control ?

Harrison's 18th Ed. 2981

- A. Retinopathy
- B. Microalbuminuria
- C. Clinical nephropathy
- D. Neuropathy

DCCT demonstrated that improvement of glycemic control reduced nonproliferative & proliferative retinopathy (47%), microalbuminuria (39%), clinical nephropathy (54%) & neuropathy (60%).

725 Which of the following trial was not for the study of chronic complications of diabetes mellitus ?

Harrison's 18th Ed. 2981

- A. Diabetes Control and Complications Trial (DCCT)
- B. Tuskegee Study
- C. Kumamoto study
- D. United Kingdom Prospective Diabetes Study (UKPDS)

Tuskegee Study (1932–1972) was a prospective study of 431 African-American men with seropositive latent syphilis of >3 years' duration.

726 Individuals with DM are how much more likely to become legally blind than individuals without DM ?

Harrison's 18th Ed. 2981

- A. 5 times
- B. 10 times
- C. 15 times
- D. 25 times

Individuals with DM are 25 times more likely to become legally blind than individuals without DM.

727 Which of the following is the hallmark of "proliferative" diabetic retinopathy ?

Harrison's 18th Ed. 2982

- A. Retinal vascular microaneurysms
- B. Blot hemorrhages
- C. Neovascularization
- D. Cotton wool spots

The appearance of neovascularization in response to retinal hypoxia is the hallmark of proliferative diabetic retinopathy.

728 Individuals who have had DM for >20 years, what is the probability of detecting nonproliferative retinopathy ?

Harrison's 18th Ed. 2982

- A. 25 %
- B. 50 %
- C. 75 %
- D. 100 %

Nonproliferative retinopathy is found in almost all individuals who have had DM for >20 years.

- 729 **The earliest clinical signs of diabetic retinopathy is ?**
N Engl J Med 2004;350:48-58
A. Dot intraretinal hemorrhages
B. Cotton-wool spots
C. Neovascular glaucoma
D. Diabetic macular edema
- 730 **Lesion that occurs early in histopathology of diabetic retinopathy is ?**
N Engl J Med 2004;350:48-58
A. Selective loss of pericytes from retinal capillaries
B. Loss of capillary endothelial cells
C. Proliferation of capillary endothelial cells
D. None of the above
- 731 **Screening for gestational diabetes mellitus is recommended for pregnant women between ?**
Harrison's 16th Ed. 2179
A. 12 & 14 weeks of gestation
B. 16 & 20 weeks of gestation
C. 24 & 28 weeks of gestation
D. 32 & 36 weeks of gestation

Current recommendations advise screening for glucose intolerance between weeks 24 and 28 of pregnancy in women with high risk for GDM.

- 732 **During the first 6 to 12 months of improved glycemic control, established diabetic retinopathy ?**
Harrison's 18th Ed. 2982
A. Improves
B. Remains the same
C. Worsens
D. Any of the above

During the first 6 to 12 months of improved glycemic control, established diabetic retinopathy may transiently worsen.

- 733 **In a 24 hour collected urine sample, microalbuminuria is defined as ?**
Harrison's 18th Ed. 2982
A. 10 to 100 mg/day
B. 20 to 200 mg/day
C. 30 to 300 mg/day
D. 40 to 400 mg/day
- 734 **In a spot urine collection, microalbuminuria is defined as ?**
Harrison's 18th Ed. 2982
A. 10 to 100 µg/mg creatinine
B. 20 to 200 µg/mg creatinine
C. 30 to 299 µg/mg creatinine
D. 40 to 400 µg/mg creatinine

Microalbuminuria is defined as 30 to 299 mg/day in a 24-hour collection or 30 to 299 µg/mg creatinine in a spot collection.

- 735 **Interventions effective in slowing progression from microalbuminuria to overt nephropathy include all except ?**
Harrison's 18th Ed. 2983
A. Strict blood pressure control

- B. Administration of ACE inhibitors or ARBs
C. Administration of beta blockers
D. Treatment of dyslipidemia

Interventions effective in slowing progression from microalbuminuria to overt nephropathy include near normalization of glycemia, strict blood pressure control, administration of ACE inhibitors or ARBs and treatment of dyslipidemia.

- 736 **In type 2 DM, preferred drug for blood pressure control is ?**
Harrison's 18th Ed. 2983
A. ACE inhibitors
B. ARBs
C. Beta blockers
D. Calcium channel blockers
- 737 **In type 2 DM, preferred drug for blood pressure control is ?**
Harrison's 18th Ed. 2983
A. Diuretics
B. ARBs
C. Beta blockers
D. Calcium channel blockers

Drug-specific benefit in diabetic nephropathy, independent of blood pressure control, has been shown for ACE inhibitors in type 1 DM and ARBs in type 2 DM. ACE inhibitors (in types 1 and 2 DM) and ARBs (in type 2 DM) slow the progression of diabetic renal disease.

- 738 **Leading cause of death in diabetic individuals on dialysis is ?**
Harrison's 18th Ed. 2984
A. Atherosclerosis
B. Infection
C. Dyselectrolytemia
D. Suicide

Atherosclerosis is the leading cause of death in diabetic individuals on dialysis

- 739 **The most common form of diabetic neuropathy is ?**
Harrison's 18th Ed. 2984
A. Distal symmetric polyneuropathy
B. Diabetic polyradiculopathy
C. Mononeuropathy
D. Mononeuropathy multiplex

The most common form of diabetic neuropathy is distal symmetric polyneuropathy.

- 740 **Involvement of which of the following cranial nerves is most common in DM ?**
Harrison's 18th Ed. 2984
A. II
B. III
C. VI
D. VII

Involvement of the third cranial nerve is most common in DM and manifests as diplopia.

- 741 **Which of the following antiarrhythmic drug is useful in the treatment of chronic, painful diabetic neuropathy ?**
Harrison's 16th Ed. 2166
A. Procainamide
B. Mexilitine
C. Adenosine

D. Ibutilide

Chronic, painful diabetic neuropathy may respond to tricyclic antidepressants, gabapentin, NSAIDs, mexilitine, phenytoin, carbamazepine and capsaicin cream.

742 Which of the following antiepileptic drug is useful in the treatment of chronic, painful diabetic neuropathy ?

Harrison's 18th Ed. 2984

- A. Gabapentin
- B. Phenytoin
- C. Carbamazepine
- D. All of the above

Chronic, painful diabetic neuropathy may respond to gabapentin, phenytoin & carbamazepine. Chronic, painful diabetic neuropathy may respond to amitriptyline, desipramine, nortriptyline, imipramine or selective serotonin norepinephrine reuptake inhibitors, gabapentin, pregabalin, carbamazepine, lamotrigine.

743 Which of the following drug is useful in orthostatic hypotension due to diabetic autonomic neuropathy ?

Harrison's 18th Ed. 2985

- A. Midodrine
- B. Clonidine
- C. Octreotide
- D. All of the above

Orthostatic hypotension due to diabetic autonomic neuropathy may respond to fludrocortisone, midodrine, clonidine, octreotide and yohimbine.

744 Earliest sign of diabetic neuropathy is ?

Harrison's 18th Ed. 2985

- A. Erectile dysfunction
- B. Gastroparesis
- C. Anhidrosis of the lower extremities
- D. Distal sensory loss

Erectile dysfunction and retrograde ejaculation are very common in DM and may be one of the earliest signs of diabetic neuropathy.

745 Drugs that improve symptoms of gastroparesis in DM include all except ?

Harrison's 18th Ed. 2985

- A. Domperidone
- B. Loperamide
- C. Metoclopramide
- D. Erythromycin

Drugs that promote gastric emptying include dopamine agonists (metoclopramide, domperidone), bethanechol. Erythromycin interacts with motilin receptor and may promote gastric emptying. Diabetic diarrhea is treated symptomatically with loperamide and may respond to octreotide.

746 Which of the following statements is correct for cardiovascular death rate among men and women in type 2 DM ?

Harrison's 18th Ed. 2985

- A. More in men than women
- B. More in women than men
- C. Equal in men and women
- D. Any of the above

After controlling for all known cardiovascular risk factors, type 2 DM increases the cardiovascular death rate twofold in men and fourfold in women.

747 Most common pattern of dyslipidemia in DM is ?

Harrison's 18th Ed. 2985

- A. Increased LDLc
- B. Reduced HDLc
- C. Increased Tg
- D. Increased Tg and reduced HDLc

Most common pattern of dyslipidemia is hypertriglyceridemia & reduced HDL cholesterol levels.

748 Which of the following should receive first priority in treating hyperlipidemia in DM ?

Harrison's 18th Ed. 2986

- A. Lower LDLc
- B. Raise HDLc
- C. Lower triglycerides
- D. Lower VLDLc

Order of priorities in treatment of hyperlipidemia in DM is to lower LDLc, raise HDLc & lower triglycerides.

749 Combination therapy of HMG CoA reductase inhibitor and fibric acid derivative increases the chances of ?

Harrison's 18th Ed. 2986

- A. Gall stones
- B. Myositis
- C. Dementia
- D. Skin rash

Combination therapy with an HMG CoA reductase inhibitor and fibric acid derivative increases the possibility of myositis.

750 In the treatment of hypertriglyceridemia, which of the following should not be used ?

Harrison's 18th Ed. 2986

- A. HMG CoA reductase inhibitors
- B. Bile acid binding resins
- C. Fibric acid derivative
- D. All of the above

Bile acid binding resins should not be used if hypertriglyceridemia is present.

751 All of the following drugs are glucose-neutral except ?

Harrison's 18th Ed. 2986

- A. ACE inhibitors
- B. Beta blockers
- C. Calcium channel blockers
- D. Central adrenergic antagonists

ACE inhibitors, calcium channel blockers, α -adrenergic blockers, central adrenergic antagonists & vasodilators are glucose- and lipid-neutral. β -blockers & thiazide diuretics increase insulin resistance.

752 Which of the following infections occur almost exclusively in diabetics ?

Harrison's 18th Ed. 2988

- A. Rhinocerebral mucormycosis
- B. Emphysematous infections of gall bladder & urinary tract
- C. "Malignant" or invasive otitis externa
- D. All of the above

Rare infections like rhinocerebral mucormycosis, emphysematous infections of gall bladder & urinary tract, and "malignant" or invasive otitis externa are seen almost exclusively in diabetics.

753 A 1% rise in HbA1C translates into how much increase in mean glucose level ?

Harrison's 17th Ed. 2296

- A. 15 mg/dL
- B. 25 mg/dL
- C. 35 mg/dL
- D. 45 mg/dL

A 1% rise in the A1C translates into a 35 mg/dL increase in the mean glucose level.

754 In standardized assays, HbA1C of 6% approximates what level of mean plasma glucose value ?

Harrison's 17th Ed. 2296

- A. 105 mg/dL
- B. 115 mg/dL
- C. 125 mg/dL
- D. 135 mg/dL

In standardized assays, HbA1C approximates the following mean plasma glucose values: 6% = 135 mg/dL, 7% = 170 mg/dL, 8% = 205 mg/dL.

755 In patients who have achieved glycemic goal, ADA recommends measurement of the HbA1C how frequently ?

Harrison's 18th Ed. 2992

- A. Once per year
- B. Twice per year
- C. Thrice per year
- D. Four times per year

In patients who have achieved glycemic goal, ADA recommends HbA1C estimation twice a year.

756 Which disease may interfere with the HbA1C result ?

Harrison's 18th Ed. 2992

- A. Hemoglobinopathies
- B. Hemolytic anemia
- C. Uremia
- D. All of the above

Depending on the assay methodology, hemoglobinopathies, hemolytic anemias, and uremia may interfere with the HbA1C result.

757 Which other glycated compound can be measured for determining glycemic control ?

Harrison's 18th Ed. 2992

- A. Albumin
- B. Globulin
- C. Ketone
- D. All of the above

Fructosamine assay (measuring glycated albumin) reflects glycemic status over prior 2 weeks but there are no studies to indicate whether such assays accurately predict the complications of DM.

758 Plasma glucose values are higher than whole blood values by ?

Harrison's 16th Ed. 2172 Table 323-9

- A. 2 - 5 %
- B. 5 - 10 %
- C. 10 - 15 %
- D. 15 - 20 %

Plasma glucose values are 10-15% higher than whole blood values.

759 Mixing of intermediate and short-acting insulin formulations alters the insulin absorption profile of ?

Harrison's 18th Ed. 2993

- A. Short-acting insulin
- B. Intermediate acting insulin
- C. Both of the above
- D. None of the above

Mixing of intermediate and short-acting insulin formulations may alter the insulin absorption profile especially of the short-acting insulins.

760 Basal insulin is provided by which of the following insulins ?

Harrison's 18th Ed. 2993

- A. Glargine insulin
- B. Aspart
- C. Lispro
- D. Glulisine

Intermediate- or long-acting insulins (NPH, lente, ultralente, glargine) supply basal insulin, whereas regular, aspart, or lispro provides prandial insulin.

761 Which of the following insulin regimen reproduces the precise insulin secretory pattern of the pancreatic islet ?

Harrison's 18th Ed. 2993

- A. Short + Intermediate
- B. Short + long
- C. Intermediate + long
- D. None of the above

No insulin regimen reproduces the precise insulin secretory pattern of the pancreatic islet.

762 Fasting glucose is primarily determined by ?

Harrison's 18th Ed. 2994

- A. Prior evening long-acting insulin
- B. Morning short acting insulin
- C. Morning long-acting insulin
- D. Pre-supper short-acting insulin

Fasting glucose is primarily determined by the prior evening long-acting insulin, pre-lunch glucose is a function of morning short-acting insulin, pre-supper glucose is a function of morning long-acting insulin and bedtime glucose is a function of the pre-supper, short-acting insulin.

763 Which of the following insulins is used in continuous subcutaneous insulin infusion (CSII) ?

Harrison's 18th Ed. 2994

- A. NPH
- B. Ultralente
- C. Glargine
- D. Lispro

Most physicians use lispro, glulisine, or insulin aspart in CSII.

764 Oral glucose lowering agents that is effective in type 1 DM is ?

Harrison's 18th Ed. 2995

- A. Sulfonylureas
- B. Biguanides
- C. Thiazolidinediones
- D. Alpha glucosidase inhibitors

Oral glucose lowering agents with the exception of alpha-glucosidase inhibitors and an amylase analogue are ineffective in type 1 DM.

765 Weight gain does not occur with which of the following drugs for type 2 DM ?

Harrison's 18th Ed. 2995

- A. Insulin
- B. Insulin secretagogues
- C. Thiazolidinediones
- D. Metformin

Metformin reduces fasting plasma glucose and insulin levels, improves the lipid profile, and promotes modest weight loss.

766 PPAR- γ is found at highest levels in ?

Harrison's 18th Ed. 2995

- A. Adipocytes
- B. Liver
- C. Skeletal muscles
- D. Pancreas

PPAR γ is a transcription factor that is activated by certain fatty acids, prostanoids & thiazolidinediones. Whereas the isoform PPAR γ 1 is expressed in most tissues, PPAR γ 2 is specific for adipose tissue, where it has a key role in regulation of normal adipocyte differentiation & proliferation as well as fatty acid uptake & storage.

767 "PPAR" stands for ?

N Engl J Med 2004;351:1106-18

- A. Peroxisome-protein-activated receptor
- B. Peroxisome-proliferator-activated receptor
- C. Peroxisome-producer-activated receptor
- D. Peroxisome-promoter-activated receptor

Peroxisome-proliferator-activated receptors (PPARs) are a subfamily of 48-member nuclear-receptor superfamily & regulate gene expression in response to ligand binding. Peroxisome-proliferator-activated receptor γ (PPAR γ) is a transcription factor activated by thiazolidinediones (TZDs).

768 PPAR α is expressed in all except ?

N Engl J Med 2004;351:1106-18

- A. Adipose tissue
- B. Liver
- C. Heart
- D. Muscle

PPAR α is expressed in the liver, heart, and muscle, as well as in the vascular wall.

769 Which of the following is a PPAR α agonist ?

N Engl J Med 2004;351:1106-18

- A. Fenofibrate
- B. Bezafibrate
- C. Gemfibrozil
- D. All of the above

Fibrates like fenofibrate, bezafibrate, ciprofibrate & gemfibrozil act as full or partial PPAR α agonists.

770 PPAR δ is expressed in which of the following tissues ?

N Engl J Med 2004;351:1106-18

- A. Skin
- B. Brain
- C. Adipose tissue
- D. All of the above

Highest expression of PPAR δ is in the skin, brain, and adipose tissue.

771 Expression of PPAR γ is lowest in which of the following tissues ?

N Engl J Med 2004;351:1106-18

- A. Adipose tissue
- B. Pancreatic beta cells
- C. Skeletal muscle
- D. Macrophages

PPAR γ is expressed most abundantly in adipose tissue but is also found in pancreatic beta cells, vascular endothelium, and macrophages. Its expression is low in tissues that express predominantly PPAR α such as the liver, the heart, and skeletal muscle.

772 Which of the following is true for "incretin" hormones ?

- A. Decrease insulin secretion
- B. Increase insulin secretion
- C. Prevents insulin degradation
- D. Augments insulin degradation

The incretins are hormones that work to augment glucose-stimulated insulin secretion. There are two main incretin hormones in humans, GIP (glucose-dependent insulinotropic peptide; also known as gastric inhibitory peptide) and GLP-1 (glucagon-like peptide-1). GLP-1 inhibits glucagon secretion and delays stomach emptying. Both hormones are secreted by endocrine L cells located in the epithelium of small intestine. Glucose in small intestine stimulates incretin release. Incretins are carried through the circulation to their target tissue like pancreatic beta cells. Incretin stimulation of beta cells causes them to secrete more insulin in response to the same amount of blood glucose.

773 Exenatide was originally isolated from ?

- A. Snake venom
- B. Lizard venom
- C. Spider venom
- D. Scorpion venom

Exenatide is a peptide GLP-1 receptor agonist that was originally isolated from lizard venom. It is resistant to degradation by DPP-4, the major protease that breaks down GIP and GLP-1.

774 'Incretin effect' refers to ?

- A. Plasma insulin response to glucose taken orally is more than when administered intravenously
- B. Plasma insulin response to glucose administered intravenously is more than when taken orally
- C. Over response to insulin
- D. Under response to insulin

775 The major protease that breaks down GIP and GLP-1 is ?

- A. Dipeptidyl peptidase (DPP) 1
- B. Dipeptidyl peptidase (DPP) 2
- C. Dipeptidyl peptidase (DPP) 3
- D. Dipeptidyl peptidase (DPP) 4

Dipeptidyl peptidase 4 is the enzyme responsible for the degradation of GLP-1 and GIP. DPP 4 is a cell-surface and circulating-peptidase enzyme and is also known as CD26 (a T-cell activating antigen). This has widespread expression throughout GI tract, pancreas, kidneys, thymus gland. Preventing degradation of incretin hormones by blocking action of DPP 4 has led to the creation of a new class of drugs known as 'gliptins'. Sitagliptin (Januvia) is the first on the market in UK and was licensed in April 2007. It is a once-daily oral dose for combination with metformin or glitazones and not yet indicated for monotherapy. It is mostly excreted unchanged by kidneys. It involves active tubular secretion via OAT-3 and so renal function should be monitored.

776 Which of the following is a 'long acting' insulin analogue ?

N Engl J Med 2005;352:174-83

- A. Insulin detemir
- B. Insulin glulisine
- C. Insulin lispro
- D. Insulin aspart

777 Which of the following drugs does not directly cause hypoglycemia ?

Harrison's 18th Ed. 2995

- A. Biguanides
- B. α glucosidase inhibitors
- C. Thiazolidinediones
- D. All of the above

Biguanides, alpha-glucosidase inhibitors & thiazolidinediones do not directly cause hypoglycemia.

778 Which of the following drugs is used as monotherapy for type 2 DM ?

Harrison's 18th Ed. 2995

- A. Metformin
- B. Alpha glucosidase inhibitors
- C. Thiazolidinediones
- D. All of the above

Insulin secretagogues, biguanides, alpha-glucosidase inhibitors, thiazolidinediones, exenatide & insulin are approved for monotherapy of type 2 DM.

779 Which of the following elements potentiates action of insulin ?

Harrison's 17th Ed. 449

- A. Zinc
- B. Copper
- C. Chromium
- D. Selenium

Chromium potentiates action of insulin in those with impaired glucose tolerance by increasing insulin receptor mediated signaling. Rich food sources of chromium include yeast, meat & grain products.

780 Which of the following statements is false ?

Harrison's 18th Ed. 3002

- A. Pregnancy is associated with insulin resistance
- B. High glucose levels are teratogenic to fetus
- C. Insulin crosses placenta
- D. Macrosomia is due to anabolic effects of insulin

Pregnancy is associated with marked insulin resistance. Glucose at high levels is a teratogen to developing fetus, readily crosses placenta. **Insulin does not cross placenta.** Anabolic & growth effects of insulin results in macrosomia.

781 Most crucial period of glycemic control during pregnancy is ?

Harrison's 18th Ed. 3002

- A. Soon after fertilization
- B. Around 3 months
- C. Around 7 months
- D. Intrapartum

Most crucial period of glycemic control is soon after fertilization. The risk of fetal malformations is increased 4 to 10 times in individuals with uncontrolled DM at the time of conception.

782 Gestational diabetes is best treated with ?

Harrison's 16th Ed. 35

- A. Insulin
- B. Metformin
- C. Sulfonyleurea
- D. Any of the above

Therapy for GDM involves MNT & insulin, if hyperglycemia persists. Oral glucose-lowering agents have not been approved for use during pregnancy. More data on safety & efficacy of glyburide for management of gestational diabetes are needed before it supplants insulin as treatment agent of choice.

783 Supplementation of which of the following in pregnancy with diabetes mellitus reduces risk of fetal neural tube defects ?

Harrison's 16th Ed. 35

- A. Iron
- B. Calcium
- C. Folate
- D. Vitamin B₁₂

Folate supplementation reduces the incidence of fetal neural tube defects, which occur with greater frequency in fetuses of diabetic mothers.

784 In women with high risk for GDM, screening for glucose intolerance should be done between which weeks of pregnancy ?

Harrison's 18th Ed. 3002

- A. 3 & 12
- B. 12 & 24
- C. 24 & 28
- D. 28 & 36

Current recommendations advise screening for glucose intolerance between weeks 24 and 28 of pregnancy in women with high risk for GDM.

785 Leprechaunism is related to ?

Harrison's 18th Ed. 3002

- A. General anesthesia
- B. Lipodystrophy
- C. Bulimia
- D. All of the above

Lipodystrophy, or the loss of subcutaneous fat tissue, may be generalized in the genetic condition leprechaunism. Generalized lipodystrophy is associated with severe insulin resistance and is accompanied by acanthosis nigricans and dyslipidemia.

Chapter 345. Hypoglycemia

786 For diagnosis of hypoglycemia, Whipple's triad consists of all except ?

Harrison's 18th Ed. 3003

- A. History of diabetes mellitus
- B. Hypoglycemic symptoms
- C. Low plasma glucose level
- D. Relief of symptoms after plasma glucose level is raised

Whipple's triad for diagnosis of hypoglycemia includes symptoms consistent with hypoglycemia, low plasma glucose concentration and relief of symptoms after plasma glucose level is raised.

787 Hepatic glycogen stores are sufficient to maintain plasma glucose levels for ?

Harrison's 18th Ed. 3003

- A. 4 to 6 hours
- B. 8 to 12 hours
- C. 24 to 48 hours
- D. 72 to 96 hours

Hepatic glycogen stores are sufficient to maintain plasma glucose levels for 8 to 12 hours.

788 Precursors required for gluconeogenesis include ?

Harrison's 18th Ed. 3003

- A. Lactate
- B. Pyruvate

- C. Acetyl CoA
- D. All of the above

Muscle provides lactate, pyruvate, alanine. Triglycerides in adipose tissue are broken down into glycerol. Free fatty acids generate acetyl CoA for gluconeogenesis.

789 In hypoglycemia, which of the following is the first physiologic response to falling plasma glucose levels ?

Harrison's 18th Ed. 3004 Table 345-2

- A. Decreased Insulin
- B. Increased Glucagon
- C. Increased Epinephrine
- D. Increased Cortisol

790 Neuroglycopenic symptoms of hypoglycemia include all except ?

Harrison's 18th Ed. 3005

- A. Fatigue
- B. Hunger
- C. Seizure
- D. Loss of consciousness

Neuroglycopenic symptoms are a direct result of CNS neuronal glucose deprivation that include behavioral changes, confusion, fatigue, seizure, loss of consciousness. Hypoglycemia-induced autonomic responses include adrenergic symptoms like palpitations, tremor, and anxiety while cholinergic symptoms are sweating, hunger, and paresthesia.

791 Hypoglycemia following alcohol ingestion is due to ?

Harrison's 18th Ed. 3005

- A. Insulin sensitivity is increased
- B. Influx of exogenous glucose is reduced
- C. Endogenous glucose production is reduced
- D. Insulin clearance is reduced

Endogenous glucose production is reduced following alcohol ingestion. Ethanol blocks gluconeogenesis but not glycogenolysis.

792 GLUT is best described as a ?

N Engl J Med 1999;341:248

- A. Transmembrane protein
- B. Nuclear protein
- C. Cytoplasmic protein
- D. Mitochondrial protein

Group of glucose transporters (GLUT) consists of five homologous trans-membrane proteins, GLUT-1, 2, 3, 4, and 5 that are encoded by distinct genes.

793 Which of the following GLUT is an insulin-responsive glucose transporter ?

N Engl J Med 1999;341:248

- A. GLUT-1
- B. GLUT-2
- C. GLUT-3
- D. GLUT-4

GLUT-4 is the main insulin-responsive glucose transporter, located primarily in muscle cells & adipocytes.

794 Which of the following GLUT is a fructose transporter ?

N Engl J Med 1999;341:248

- A. GLUT-2
- B. GLUT-3
- C. GLUT-4

D. GLUT-5

GLUT-5 is distributed in small intestine, sperm, kidney, brain, adipose cells and muscle. It is characteristically a fructose transporter and has a very low affinity for glucose.

795 Which of the following GLUT is found in placenta ?

N Engl J Med 1999;341:248

- A. GLUT-1
- B. GLUT-2
- C. GLUT-3
- D. GLUT-4

GLUT-3 is distributed in neurons and placenta. It is a high-affinity glucose transporter.

796 Blood-to-brain glucose transport is facilitated by ?

N Engl J Med 2004;350:2272-9

- A. GLUT-1
- B. GLUT-2
- C. GLUT-3
- D. GLUT-4

Mutations in GLUT-1 are associated with intractable seizures resulting from a reduction in glucose transport across the blood-brain barrier.

797 Fanconi - Bickel syndrome is caused by mutations in which of the following glucose transporters ?

N Engl J Med 1999;341:248

- A. GLUT-1
- B. GLUT-2
- C. GLUT-3
- D. GLUT-4

GLUT-2 mutations cause the rare, autosomal recessive Fanconi - Bickel syndrome characterized by hepatic & renal glycogen accumulation, nephropathy & impaired utilization of glucose & galactose.

798 Falling arterial glucose concentrations are sensed by ?

N Engl J Med 2004;350:2272-9

- A. Brain
- B. Hepatic portal vein
- C. Carotid body
- D. All of the above

799 Which of the following is true about syndrome of hypoglycemia unawareness ?

N Engl J Med 2004;350:2272-9

- A. Attenuated sympathetic neural response
- B. Attenuated adrenomedullary response
- C. Loss of neurogenic warning symptoms
- D. All of the above

Periods of relative or absolute therapeutic insulin excess leading to falling glucose concentrations, with absent counterregulatory glucagon responses, reduced autonomic responses, reduced epinephrine responses cause hypoglycemia unawareness.

800 Syndrome of hypoglycemia unawareness can be reversed by ?

Harrison's 18th Ed. 3006

- A. >1 week of scrupulous avoidance of hypoglycemia
- B. >1 week of scrupulous avoidance of hyperglycemia
- C. >2 weeks of scrupulous avoidance of hypoglycemia
- D. >2 weeks of scrupulous avoidance of hyperglycemia

Syndrome of hypoglycemia unawareness can be reversed by >2 weeks of scrupulous avoidance of hypoglycemia.

801 Which of the following statements about postprandial (reactive) hypoglycemia is false ?

Harrison's 17th Ed. 2308

- A. Occurs only after meals
- B. Self-limited
- C. Alimentary hypoglycemia
- D. None of the above

Postprandial (reactive) hypoglycemia occurs only after meals and is self-limited. Causes include enzymatic defects in carbohydrate metabolism like hereditary fructose intolerance and galactosemia, post gastric surgery (alimentary hypoglycemia).

802 Which of the following might help in the treatment of postprandial (reactive) hypoglycemia ?

Harrison's 17th Ed. 2309

- A. Metformin
- B. Alpha-glucosidase inhibitor
- C. Glucagon
- D. All of the above

Alpha-glucosidase inhibitor delays carbohydrate digestion and glucose absorption from intestine and may be useful in reactive hypoglycemia.

803 Which of the following is a cause of fasting hypoglycemia ?

Harrison's 18th Ed. 3007

- A. Ethanol use
- B. Sepsis
- C. Renal failure
- D. All of the above

Apart from insulin and sulfonylureas, ethanol use, sepsis and renal failure are causes of fasting hypoglycemia. In sepsis, endogenous glucose production is impaired due to hepatic hypoperfusion, and cytokine induced glucose utilization is increased.

804 Fasting hypoglycemia occurs with which of the following ?

Harrison's 18th Ed. 3007

- A. Hepatoma
- B. Adrenocortical tumors
- C. Carcinoids
- D. All of the above

Hepatoma, adrenocortical tumors and carcinoids can cause fasting hypoglycemia due to overproduction of insulin-like growth factor (IGF) II that through insulin or IGF-I receptors.

805 Somogyi effect is best understood as ?

Joslin's Diabetes mellitus 13th Ed. 499

- A. Post hyperglycemic hypoglycemia
- B. Post hypoglycemic hyperglycemia
- C. Nocturnal hypoglycemia
- D. All of the above

806 Use of which of the following drugs can cause hypoglycemia ?

Harrison's 17th Ed. 2307

- A. Pentamidine
- B. Quinine
- C. Salicylates
- D. All of the above

Pentamidine is toxic to the pancreatic beta cell. Initially it causes insulin release with hypoglycemia, and later predisposes to diabetes mellitus. Quinine stimulates insulin secretion. Salicylates and sulfonamides can cause hypoglycemia.

807 Endogenous hyperinsulinism is diagnosed by ?

Harrison's 18th Ed. 3007

- A. Fasting plasma insulin $\geq 6 \mu\text{U/mL}$
- B. Fasting plasma C-peptide $\geq 0.6 \text{ ng/mL}$
- C. Fasting plasma glucose $\leq 45 \text{ mg/dL}$
- D. All of the above

Despite of hypoglycemia, plasma insulin & C-peptide levels are high in endogenous hyperinsulinism.

808 Which of the following inhibits insulin release from pancreas ?

Harrison's 18th Ed. 3008

- A. Furosemide
- B. Thiazide
- C. Ethacrynic acid
- D. Diazoxide

Diazoxide has a hyperglycemic effect due to inhibition of insulin release from pancreas, as well as an extrapancreatic (catecholamine-induced) effect.

809 Factitious hypoglycemia due to self-ingestion of sulfonylurea is best diagnosed by ?

Harrison's 18th Ed. 3008

- A. High plasma insulin level
- B. High plasma C-peptide level
- C. High plasma sulfonylurea level
- D. All of the above

Sulfonylureas stimulate endogenous insulin and can be best detected by measuring drug levels in plasma or urine.

810 In urgent treatment of hypoglycemia, what should be the reasonable initial dose of oral glucose ?

Harrison's 18th Ed. 3009

- A. 10 gram
- B. 20 gram
- C. 30 gram
- D. 40 gram

Reasonable initial dose of oral glucose is 20 grams for urgent oral treatment of hypoglycemia.

811 What is the primary mechanism of action of glucagon in treatment of hypoglycemia ?

Harrison's 18th Ed. 3009

- A. Stimulates glycogenolysis
- B. Stimulates gluconeogenesis
- C. Stimulates insulin secretion
- D. All of the above

Glucagon primarily acts by stimulating glycogenolysis.

812 Stiff-Person Syndrome is associated with all except ?

Harrison's 16th Ed. 138

- A. Diabetes mellitus
- B. Small cell cancer of lung
- C. Breast cancer
- D. Hypertension

813 Bilateral nontender parotid enlargement occurs with all except ?

Harrison's 17th Ed. 220

- A. Bulimia

- B. Diabetes mellitus
- C. Cirrhosis
- D. Thyroxine

Bilateral nontender parotid enlargement occurs with diabetes mellitus, cirrhosis, bulimia, HIV/AIDS, and drugs (e.g., iodide, propylthiouracil).

814 Which of the following is not a cause of bilateral parotid gland enlargement ?

Harrison's 17th Ed. 2108 Table 317-3

- A. Hypopituitarism
- B. Diabetes mellitus
- C. Chronic pancreatitis
- D. Hepatic cirrhosis

815 Which of the following drugs can cause weight loss ?

Harrison's 17th Ed. 256 Table 41-1

- A. Serotonin reuptake inhibitors
- B. Metformin
- C. ACE inhibitors
- D. All of the above

Medications that can cause weight loss are antibiotics, nonsteroidal anti-inflammatory drugs, serotonin reuptake inhibitors, metformin, levodopa and ACE inhibitors.

816 Acanthosis nigricans is associated with ?

Harrison's 17th Ed. 325

- A. Acromegaly
- B. Cushing's syndrome
- C. Stein-Leventhal syndrome
- D. All of the above

Acanthosis nigricans is associated with obesity and insulin resistance. It may reflect an endocrinopathy such as acromegaly, Cushing's syndrome, polycystic ovary syndrome, or insulin-resistant diabetes mellitus (type A, type B, and lipotrophic forms).

817 Which of the following is false about necrobiosis lipoidica ?

Harrison's 17th Ed. 332

- A. Found on thigh
- B. Obliterative endarteritis
- C. Telangiectasias
- D. Erythematous border

Lesions of necrobiosis lipoidica are found primarily on the shins (90%). Features include central yellow color, atrophy, telangiectasias, and erythematous border. Biopsy shows necrobiosis of collagen, granulomatous inflammation and obliterative endarteritis.

818 Which of the following is false about 'Prayer hand deformity' ?

Harrison's 16th Ed. 1986

- A. Type 1 diabetes mellitus
- B. Digital sclerosis
- C. Contractures
- D. None of the above

Patients with insulin-dependent diabetes mellitus may develop digital sclerosis & contractures (prayer hand deformity).

819 Most frequent cause of neuropathic joint disease is ?

Harrison's 17th Ed. 2180

- A. Leprosy
- B. Meningomyelocele

- C. Diabetes mellitus
- D. Amyloidosis

820 Joint most commonly affected in diabetes mellitus is ?

Harrison's 17th Ed. 2181

- A. Knee, hip & ankle
- B. Glenohumeral joint
- C. Elbow & wrist
- D. Tarsal & tarsometatarsal joint

821 Which of the following describes "Rocker foot" ?

Harrison's 17th Ed. 2181

- A. Calluses over metatarsal heads
- B. Convexity of sole
- C. Osteophyte protrusion from top of foot
- D. All of the above

822 Lisfranc fracture-dislocation is related to ?

Harrison's 17th Ed. 2181

- A. Knee, hip & ankle
- B. Glenohumeral joint
- C. Elbow & wrist
- D. Tarsometatarsal joint

823 Which of the following tests is not useful in differentiating neuropathic joint disease from osteomyelitis ?

Harrison's 17th Ed. 2181

- A. MRI
- B. Indium 111 labeled white blood cells
- C. Indium 111 labeled immunoglobulin G
- D. Technetium bone scan

824 Which of the following is a cause of chronic renal disease with normal kidney size ?

Harrison's 16th Ed. 1660

- A. HIV-associated renal disease
- B. Amyloidosis
- C. Diabetes
- D. All of the above

825 Emphysematous pyelonephritis is most common in which of the following diseases ?

Harrison's 17th Ed. 1826

- A. HIV
- B. Diabetes
- C. Tuberculosis
- D. All of the above

Emphysematous pyelonephritis & cystitis almost always occur in diabetic patients, often with urinary obstruction & chronic infection.

826 Lipid abnormalities in patients with type 2 diabetes mellitus include all except ?

Harrison's 17th Ed. 2424

- A. Elevated plasma triglycerides
- B. Elevated dense LDL
- C. Elevated plasma LDL-C

- D. Decreased HDL-C

Patients with type I diabetes mellitus generally do not have hyperlipidemia. Diabetic ketoacidosis is accompanied by hypertriglyceridemia. Type II diabetes mellitus causes dyslipidemia - elevated plasma Tg, elevated dense LDL, decreased HDL-C. Elevated plasma LDL-C levels usually are not a feature of diabetes mellitus. Patients with lipodystrophy with severe insulin resistance have markedly elevated levels of VLDL & chylomicrons.

827 Syndrome X is characterized by all except ?

Harrison's 16th Ed. 2311

- A. Hyperinsulinemia
- B. Hyperuricemia
- C. Hypertriglyceridemia
- D. Increased HDL cholesterol

828 Somatostatinoma syndrome consists of all except ?

Harrison's 16th Ed. 2228

- A. Diabetes mellitus
- B. Gall-bladder disease
- C. Hyperchlorhydria
- D. Diarrhea & steatorrhea

Chapter 346. Disorders of the Testes and Male Reproductive System

829 Testosterone is produced by ?

Harrison's 18th Ed. 3010

- A. Leydig cells
- B. Sertoli cells
- C. Interstitial cells
- D. All of the above

Leydig cells of the testes produce testosterone and germ cells are nurtured by Sertoli cells to divide, differentiate, and mature into sperm.

830 Testicular descent through inguinal canal is controlled by ?

Harrison's 17th Ed. 2310

- A. Insulin-like factor 1 (INSL1)
- B. Insulin-like factor 2 (INSL2)
- C. Insulin-like factor 3 (INSL3)
- D. Insulin-like factor 4 (INSL4)

831 Insulin-like factor 3 (INSL3) is produced by ?

Harrison's 18th Ed. 3010

- A. Leydig cells
- B. Sertoli cells
- C. Interstitial cells
- D. All of the above

832 Insulin-like factor 3 (INSL3) acts via receptor termed ?

Harrison's 18th Ed. 3010

- A. Great
- B. Gap
- C. Ghost
- D. Good

Testicular descent through inguinal canal is controlled by Leydig cell production of insulin-like factor 3 (INSL3), which acts via a receptor termed Great (G protein-coupled receptor affecting testis descent).

833 Mullerian inhibiting substance (MIS) is produced by ?

Harrison's 18th Ed. 3010

- A. Leydig cells
- B. Sertoli cells
- C. Interstitial cells
- D. All of the above

Sertoli cells produce müllerian inhibiting substance (MIS) which regresses müllerian structures (fallopian tube, uterus & upper segment of vagina).

834 "SRY" stands for ?

Harrison's 18th Ed. 3010

- A. Sex-regulating gene on the Y chromosome
- B. Sex-related gene on the Y chromosome
- C. Sex-restricting gene on the Y chromosome
- D. Sex-requiring gene on the Y chromosome

SRY stands for sex-related gene on the Y chromosome.

835 Formation of prostate & external male genitalia is induced by ?

Harrison's 18th Ed. 3010

- A. Testosterone
- B. Dihydrotestosterone (DHT)
- C. FSH
- D. LH

Conversion of testosterone to DHT leads to growth of external genitalia & pubic hair. DHT also stimulates prostate & facial hair growth & initiates recession of temporal hairline.

836 Growth & differentiation of Wolffian duct structures is induced by ?

Harrison's 18th Ed. 3010

- A. Testosterone
- B. DHT
- C. FSH
- D. LH

During embryonic development, testosterone and dihydrotestosterone (DHT) induce the wolffian duct and virilization of the external genitalia. During puberty, testosterone promotes somatic growth and the development of secondary sex characteristics. In the adult, testosterone is necessary for spermatogenesis and stimulation of libido & normal sexual function.

837 In males, adrenarche usually occurs between age ?

Harrison's 18th Ed. 3010

- A. 6 and 8 years
- B. 8 and 10 years
- C. 10 and 12 years
- D. 12 and 14 years

Adrenarche usually occurs between 6 - 8 years of age when adrenal gland begins to produce more of androgens from zona reticularis, the principal site of dehydroepiandrosterone (DHEA) production.

838 In males sexual maturation process is dependent on ?

Harrison's 18th Ed. 3010

- A. Dehydroepiandrosterone (DHEA)
- B. Gonadotropin-releasing hormone (GnRH)
- C. Leptin
- D. All of the above

DHEA from adrenal gland induces adrenarche. Gonadotropin-releasing hormone (GnRH) secretion from hypothalamus induces puberty through GPR54, a G protein-coupled receptor binds an endogenous ligand, metastin. Leptin hormone from adipose cells plays a permissive role in the onset of puberty.

839 In males, growth spurt occurs at a testicular volume of ?

Harrison's 18th Ed. 3010

- A. 4 to 6 mL
- B. 6 to 10 mL
- C. 10 to 12 mL
- D. 15 to 20 mL

Growth spurt occurs at a testicular volume of about 10 - 12 mL.

840 Hypothalamic GnRH is released in discrete pulses approximately every ?

Harrison's 18th Ed. 3011

- A. 1 hours
- B. 2 hours
- C. 3 hours
- D. 4 hours

841 In normal men, LH pulses occur about every ?

Harrison's 18th Ed. 3013

- A. Half - 1 hour
- B. 1 - 3 hours
- C. 3 - 4 hours
- D. 4 - 6 hours

GnRH is released in discrete pulses ~ every 2 hours, resulting in corresponding pulses of LH & FSH. LH pulses occur about every 1 - 3 hours in normal men. FSH is less pulsatile than LH because it has a longer half-life.

842 Which of the following statements is false ?

Harrison's 18th Ed. 3011

- A. LH acts on Leydig cells
- B. FSH acts on Sertoli cells
- C. Inhibin B is produced by Sertoli cells
- D. None of the above

LH acts on Leydig cell to stimulate testosterone synthesis. FSH acts on Sertoli cell to regulate spermatogenesis & production of inhibin B, which acts to selectively suppress pituitary FSH.

843 "StAR" stands for ?

Harrison's 18th Ed. 3011

- A. Steroid active regulatory protein
- B. Steroid associated regulatory protein
- C. Steroid acute regulatory protein
- D. Steroid amplifying regulatory protein

StAR stands for steroid acute regulatory protein.

844 The number of carbon atoms in a cholesterol molecule is ?

Harrison's 18th Ed. 3011 Figure 346-3

- A. 25
- B. 26
- C. 27
- D. 28

Cholesterol is a 27-carbon molecule.

845 In testosterone synthesis from cholesterol, how many major enzymatic steps are involved ?

Harrison's 18th Ed. 3011

- A. 2

- B. 3
- C. 4
- D. 5

five major enzymatic steps involved in testosterone synthesis.

846 Which of the following is converted by 17 β -HSD3 to testosterone ?

Harrison's 18th Ed. 3011 Figure 346-3

- A. Pregnenolone
- B. Progesterone
- C. Androstenedione
- D. 17-OH-Progesterone

847 Testosterone is converted to dihydrotestosterone (DHT) by ?

Harrison's 18th Ed. 3011 Figure 346-3

- A. 5 α -reductase
- B. 17 α -Hydroxylase
- C. 17 β -Hydroxysteroid dehydrogenase 2
- D. 17 β -Hydroxysteroid dehydrogenase 3

848 Pregnenolone is formed from cholesterol through cleavage by ?

Harrison's 18th Ed. 3011 Figure 346-3

- A. CYP17
- B. CYP11A1
- C. CYP19
- D. 17 β -Hydroxysteroid dehydrogenase 2

849 Which of the following acts as a catalyst ?

Harrison's 18th Ed. 3011

- A. CYP17
- B. CYP11A1
- C. CYP19
- D. 17 β -Hydroxysteroid dehydrogenase 2

17-hydroxylase & 17,20-lyase reactions are catalyzed by CYP17.

850 Daily testicular secretion of circulating testosterone is ?

Harrison's 18th Ed. 3012

- A. 3 to 10 mg/day
- B. 8 to 20 mg/day
- C. 13 to 30 mg/day
- D. 20 to 40 mg/day

In males, 95% of circulating testosterone is derived from testicular production which is 3 - 10 mg/day.

851 Which of the following statements is false ?

Harrison's 18th Ed. 3012

- A. Most circulating DHT comes from peripheral conversion of testosterone
- B. A small amount of DHT is secreted directly by testis
- C. In men, daily production of estradiol comes from peripheral conversion of testosterone & androstenedione
- D. None of the above

852 What proportion of testosterone is "unbound" ?

Harrison's 18th Ed. 3011

- A. 0.5 to 3 %

- B. 5 to 8 %
- C. 11 to 13 %
- D. 15 to 30 %

Only 0.5 - 3% of circulating testosterone is not bound to sex hormone binding globulin (SHBG) & albumin.

853 Sex hormone binding globulin (SHBG) concentrations are decreased by all except ?

Harrison's 18th Ed. 3012

- A. Androgens
- B. Obesity
- C. Hyperthyroidism
- D. Nephrotic syndrome

854 Sex hormone binding globulin (SHBG) concentrations are decreased by all except ?

Harrison's 18th Ed. 3012

- A. Androgens
- B. Estrogen
- C. Insulin
- D. Nephrotic syndrome

855 Sex hormone binding globulin (SHBG) concentrations are increased by all except ?

Harrison's 18th Ed. 3012

- A. Estrogen administration
- B. Hyperthyroidism
- C. Insulin
- D. Aging

SHBG concentrations are decreased by androgens, obesity, insulin & nephrotic syndrome. Estrogens, hyperthyroidism, chronic inflammatory illnesses & aging are associated with high SHBG concentrations.

856 Testosterone is metabolized predominantly in ?

Harrison's 18th Ed. 3012

- A. Liver
- B. Skeletal muscle
- C. Prostate
- D. Skin

Testosterone is metabolized predominantly in liver. Some degradation occurs in prostate & skin.

857 In liver, testosterone is converted enzymatically to all except ?

Harrison's 18th Ed. 3012

- A. Androsterone
- B. Androstenedione
- C. Dihydrotestosterone (DHT)
- D. 3- α -androstenediol

In the liver, testosterone is converted into androsterone, etiocholanolone, DHT, and 3- α -androstenediol. After glucuronidation or sulfation, they are excreted by the kidneys.

858 Androgen receptor (AR) is structurally related to the nuclear receptors for ?

Harrison's 18th Ed. 3012

- A. Estrogen
- B. Glucocorticoids
- C. Progesterone
- D. All of the above

AR is structurally related to nuclear receptors for estrogen, glucocorticoids & progesterone.

859 Gene encoding androgen receptor (AR) is located on ?

Harrison's 18th Ed. 3012

- A. Short arm of X chromosome
- B. Long arm of X chromosome
- C. Short arm of chromosome 9
- D. Long arm of chromosome 9

AR is encoded by a gene on the long arm of X chromosome.

860 Which of the following about androgen receptor is false ?

Harrison's 18th Ed. 3012

- A. Distributed in both cytoplasm & nucleus
- B. Is a ligand-regulated transcription factor
- C. Testosterone binds to AR with half the affinity of DHT
- D. None of the above

861 Total length of seminiferous tubules is about ?

Harrison's 18th Ed. 3012

- A. 100 meters
- B. 300 meters
- C. 400 meters
- D. 600 meters

Seminiferous tubules are convoluted, closed loops with both ends emptying into rete testis which is a network of progressively larger efferent ducts that ultimately form epididymis. Seminiferous tubules are ~ 600 meters in length & form ~two-thirds of testis volume.

862 Primary spermatocytes are derived from ?

Harrison's 18th Ed. 3012

- A. Type A spermatogonia
- B. Type B spermatogonia
- C. Type C spermatogonia
- D. Type D spermatogonia

Primary spermatocytes are derived from type B spermatogonia.

863 Which of the following serves as stem cells capable of self-renewal ?

Harrison's 18th Ed. 3012

- A. Type A spermatogonia
- B. Type B spermatogonia
- C. Type C spermatogonia
- D. Type D spermatogonia

A pool of type A spermatogonia serve as stem cells capable of self-renewal.

864 Which of the following is false about spermiogenesis ?

Harrison's 18th Ed. 3012

- A. Chromatin condensation
- B. Shedding of an acrosome
- C. Elongation of cytoplasm
- D. Formation of a tail

Spermiogenesis is a differentiation process involving chromatin condensation, acquisition of an acrosome, elongation of cytoplasm & formation of a tail.

865 Sertoli cells produce which of the following ?

Harrison's 18th Ed. 3012

- A. Inhibin B
- B. Testosterone

- C. FSH
- D. All of the above

Sertoli cells produce inhibin B, an inhibitor of FSH.

866 Process of formation of mature spermatozoa from germ cells takes about how many days ?

Harrison's 18th Ed. 3012

- A. 24 days
- B. 44 days
- C. 74 days
- D. 94 days

Complete differentiation process into mature sperm requires 74 days. The spermatozoa spend an additional 21 days in epididymis, where they undergo further maturation & capacitation.

867 Normal adult testes produces how many sperms per day ?

Harrison's 18th Ed. 3012

- A. ~25 million
- B. ~50 million
- C. ~75 million
- D. ~100 million

Normal adult testes produce >100 million sperm per day.

868 Which of the following statements is false ?

Harrison's 18th Ed. 3012

- A. Advanced age does not influence testicular size
- B. Varicocele is more common on left side
- C. In Klinefelter syndrome testicular volume is markedly reduced
- D. None of the above

869 Mild male factor infertility is defined as a sperm count of ?

Harrison's 18th Ed. 3013

- A. 5 - 10 x 10⁶/mL & normal motility
- B. 10 - 15 x 10⁶/mL & normal motility
- C. 15 - 20 x 10⁶/mL & normal motility
- D. 20 - 25 x 10⁶/mL & normal motility

870 Severe male factor infertility is defined as a sperm count of ?

Harrison's 18th Ed. 3013

- A. < 10 x 10⁶/mL & 40% motility
- B. < 10 x 10⁶/mL & 30% motility
- C. < 10 x 10⁶/mL & 20% motility
- D. < 10 x 10⁶/mL & 10% motility

Men with mild male factor infertility have sperm count of 15 - 20 x 10⁶/mL & normal motility, moderate male factor infertility have 10 - 15 x 10⁶/mL & 20 - 40% motility, while those with a severe defect have sperm count of < 10 x 10⁶/mL & 10% motility.

871 Which of the following is an androgen-dependent event ?

Harrison's 18th Ed. 3013

- A. Early morning erections
- B. Frequency & intensity of sexual thoughts
- C. Frequency of masturbation or intercourse
- D. All of the above

872 In eunuchoid proportions, which of the following is true ?

Harrison's 18th Ed. 3013

- A. Arm span is less than height

- B. Arm span is equal to height
- C. Arm span is greater than height
- D. Any of the above

Eunuchoid proportions are defined as an arm span >2 cm greater than height & suggest that androgen deficiency occurred before epiphyseal fusion.

873 "Prader orchidometer" is used to measure ?

Harrison's 18th Ed. 3013

- A. Testicular volume
- B. Testicular length
- C. Testicular area
- D. Testicular density

Testicular volume is best assessed by using a Prader orchidometer.

874 Length of normal testes ranges from ?

Harrison's 18th Ed. 3013

- A. 1.5 to 2.5 cm
- B. 2.0 to 3.0 cm
- C. 3.0 to 4.0 cm
- D. 3.5 to 5.5 cm

875 Normal adult testicular volume is about ?

Harrison's 18th Ed. 3013

- A. 5 to 12 mL
- B. 12 to 25 mL
- C. 25 to 40 mL
- D. 40 to 65 mL

Testicular volume is best assessed by Prader orchidometer. Testes range from 3.5 - 5.5 cm in length, which corresponds to a volume of 12 - 25 mL. Advanced age does not influence testicular size.

876 Which of the following statements is false ?

Harrison's 18th Ed. 3013

- A. Elevated LH indicates primary defect at testicular level
- B. Increased FSH indicates damage to seminiferous tubules
- C. Inhibin B levels are reduced with seminiferous tubule damage
- D. None of the above

In men with a low testosterone level, an LH level can distinguish primary (high LH) versus secondary (low or inappropriately normal LH) hypogonadism. Elevated LH level indicates a primary defect at testicular level. Low or inappropriately normal LH level suggests a defect at the hypothalamic-pituitary level. Increased FSH suggests damage to the seminiferous tubules. Inhibin B, a Sertoli cell product that suppresses FSH, is reduced with seminiferous tubule damage.

877 Which of the following is false about GnRH stimulation testing ?

Harrison's 18th Ed. 3013

- A. IV administration of 100 µg of GnRH
- B. Measure LH & FSH at baseline
- C. Measure LH & FSH at 30 & 60 min
- D. Acceptable response is a twofold increase in LH & FSH

The GnRH test is performed by measuring LH and FSH concentrations at baseline and at 30 & 60 minutes after IV administration of 100 µg of GnRH. A minimally acceptable response is a twofold LH increase and a 50% FSH increase.

878 Range of testosterone in healthy young men is ?

Harrison's 18th Ed. 3013

- A. 50 to 180 ng/dL
- B. 180 to 225 ng/dL

C. 225 to 300 ng/dL

D. 300 to 1000 ng/dL

Testosterone concentration in healthy young men ranges from 300 to 1000 ng/dL. Alterations in SHBG levels can affect total testosterone levels.

879 Bioavailable testosterone refers to ?

Harrison's 18th Ed. 3013

A. Total testosterone

B. Unbound testosterone + testosterone bound to albumin

C. Unbound testosterone

D. Testosterone bound to albumin

Bioavailable testosterone refers to unbound testosterone + testosterone loosely bound to albumin.

880 What proportion of circulating testosterone is unbound or free ?

Harrison's 18th Ed. 3013

A. 0.05 to 0.3 %

B. 0.3 to 0.8 %

C. 0.5 to 3 %

D. 2.5 to 8 %

Most circulating testosterone is bound to SHBG & to albumin. Only 0.5 - 3% of circulating testosterone is unbound or "free".

881 Which of the following about hCG stimulation test is false ?

Harrison's 18th Ed. 3014

A. Administer 150 to 400 IU of hCG intramuscularly

B. Measure testosterone levels at 0,24, 48, 72 & 120 hours

C. In adult men, acceptable response is a doubling of testosterone concentration

D. In prepubertal boys, an increase in testosterone to >150 ng/dL indicates the presence of testicular tissue

Administer 1500 to 4000 IU of hCG intramuscularly.

882 Which of the following is measured to detect presence of testes in prepubertal boys with cryptorchidism ?

Harrison's 18th Ed. 3014

A. Inhibin B

B. Müllerian inhibiting substance (MIS)

C. Testosterone

D. All of the above

Measurement of MIS, a Sertoli cell product, is estimated to detect the presence of testes in prepubertal boys with cryptorchidism.

883 Normal semen ejaculate volume is ?

Harrison's 18th Ed. 3014

A. 1 to 3 mL

B. 2 to 6 mL

C. 5 to 8 mL

D. 8 to 10 mL

The normal ejaculate volume is 2 - 6 mL & contains sperm counts of >20 million/mL, with a motility of >50% and >15% normal morphology.

884 Puberty in boys before what age is considered precocious ?

Harrison's 18th Ed. 3014

A. 9 years

B. 10 years

C. 11 years

D. 12 years

Puberty in boys before age 9 years is considered precocious. Precocity can be isosexual or heterosexual. Isosexual precocity can be gonadotropin-dependent or gonadotropin-independent.

885 Which of the following is false about central precocious puberty (CPP) ?

Harrison's 18th Ed. 3014

A. Gonadotropin-Dependent

B. Less common in boys than in girls

C. Elevated gonadotropin levels

D. None of the above

CPP is caused by premature activation of GnRH pulse generator and is characterized by gonadotropin levels that are inappropriately elevated for age. Because pituitary priming has occurred, GnRH elicits LH & FSH responses typical of those seen in puberty or in adults.

886 Which of the following is not a cause of gonadotropin-independent precocious puberty in boys ?

Harrison's 18th Ed. 3014 Table 346-1

A. hCG-secreting tumors

B. Hyperthyroidism

C. Congenital adrenal hyperplasia

D. McCune-Albright syndrome

Gonadotropin-independent causes of precocious puberty in boys are congenital adrenal hyperplasia, hCG-secreting tumor, McCune-Albright syndrome, hypothyroidism, activating LH receptor mutation & exogenous androgens. Androgens from the testis or the adrenal are high.

887 Which of the following disorders is also called testotoxicosis ?

Harrison's 18th Ed. 3015

A. McCune-Albright syndrome

B. Familial male-limited precocious puberty

C. Congenital adrenal hyperplasia

D. None of the above

Familial male-limited precocious puberty is also called testotoxicosis. It is an autosomal dominant disorder due to activating mutations in LH receptor leading to increased testosterone production. Testosterone levels are elevated and LH is suppressed.

888 Treatment options for familial male-limited precocious puberty include ?

Harrison's 18th Ed. 3015

A. Ketoconazole

B. Flutamide

C. Anastrozole

D. All of the above

Treatment options for familial male-limited precocious puberty include inhibitors of testosterone synthesis (ketoconazole), androgen receptor antagonists (flutamide) & aromatase inhibitors (anastrozole).

889 Which of the following skin lesion is characteristic of McCune-Albright syndrome ?

Harrison's 18th Ed. 3015

A. Erythroderma

B. Café au lait spots

C. Telangiectasia

D. Scarring alopecia

Cafe-au-lait spots are characteristic skin lesions and reflect the onset of somatic mutations in melanocytes during embryonic development.

890 In McCune-Albright syndrome, mutation occurs in which of the following ?

Harrison's 18th Ed. 3015

- A. G_s alpha subunit
- B. G_s beta subunit
- C. G_s gamma subunit
- D. G_s delta subunit

McCune-Albright syndrome is caused by somatic activating mutations in $G_s\alpha$ subunit that links G protein-coupled receptors to intracellular signaling pathways. Mutations impair GTP activity of the $G_s\alpha$ protein, leading to constitutive activation of adenyl cyclase and stimulates testosterone production leading to gonadotropin-independent precocious puberty.

891 Which of the following is false about congenital adrenal hyperplasia (CAH) ?

Harrison's 18th Ed. 3015

- A. Chronic ACTH stimulation
- B. Low LH
- C. Small testes
- D. None of the above

Boys with CAH if untreated with adequate glucocorticoid suppression of ACTH can develop premature virilization because of excessive androgen production by adrenal gland. LH is low & testes are small.

892 Breast enlargement in prepubertal boys can result from ?

Harrison's 18th Ed. 3015

- A. Familial aromatase excess
- B. Marijuana smoking
- C. Sertoli cell tumors in the testis
- D. All of the above

Breast enlargement in prepubertal boys can result from familial aromatase excess, estrogen-producing tumors in adrenal gland, Sertoli cell tumors in testis, marijuana smoking, or exogenous estrogens or androgens and germ cell tumors that secrete hCG.

893 In children with gonadotropin-independent precocious puberty, which of the following is not useful ?

Harrison's 18th Ed. 3015

- A. Ketoconazole
- B. Long-acting GnRH analogues
- C. Spironolactone
- D. Testolactone

Long-acting GnRH analogues can be used to suppress gonadotropins in gonadotropin-dependent precocious puberty. Ketoconazole inhibits steroidogenesis, spironolactone is a weak androgen antagonist and testolactone and letrozole are aromatase inhibitor.

894 Puberty is considered delayed in boys if it has not happened by the age of ?

Harrison's 18th Ed. 3016

- A. 14
- B. 15
- C. 16
- D. 18

Puberty is delayed in boys if it has not ensued by age 14 years.

895 Which of the following categories of delayed puberty is more common in girls than in boys ?

Harrison's 18th Ed. 3016

- A. Constitutional delay of growth and puberty
- B. Functional hypogonadotropic hypogonadism caused by systemic illness or malnutrition

- C. Hypogonadotropic hypogonadism caused by genetic or acquired defects in the hypothalamic-pituitary region
- D. Hypergonadotropic hypogonadism secondary to primary gonadal failure

Delayed puberty is more common in boys than in girls. But, functional hypogonadotropic hypogonadism is more common in girls than in boys.

896 Which of the following is the most common cause of delayed puberty ?

Harrison's 18th Ed. 3016

- A. Constitutional delay
- B. Functional hypogonadotropic hypogonadism due to systemic illness or malnutrition
- C. Hypogonadotropic hypogonadism due to genetic or acquired defects in hypothalamic-pituitary region
- D. Hypergonadotropic hypogonadism secondary to primary gonadal failure

897 Constitutional delay in puberty should be suspected when there is ?

Harrison's 18th Ed. 3016

- A. Positive family history
- B. Delayed bone age
- C. Short stature
- D. All of the above

Constitutional delay should be suspected when there is a family history, evidence of delayed bone age & short stature.

898 Familial hypogonadotropic hypogonadism is transmitted most commonly as ?

Harrison's 18th Ed. 3015

- A. X-linked
- B. Autosomal recessive
- C. Autosomal dominant
- D. Autosomal codominant

Testotoxicosis or familial male-limited precocious puberty is an autosomal dominant disorder.

899 What testicular length generally indicates that the child has entered puberty ?

Harrison's 18th Ed. 3016

- A. > 1.5 cm
- B. > 2.0 cm
- C. > 2.5 cm
- D. > 3.5 cm

Testicular size >2.5 cm generally indicates that the child has entered puberty.

900 Kallmann syndrome is transmitted as ?

Harrison's 18th Ed. 3017

- A. X-linked
- B. Autosomal recessive
- C. Autosomal dominant
- D. Autosomal codominant

901 Kallmann syndrome is due to mutation in which gene ?

Harrison's 18th Ed. 3017

- A. KAL1

- B. KAL2
- C. GPR54
- D. DAX1

902 KAL1 gene encodes which of the following ?

Harrison's 18th Ed. 3017

- A. Kalmin
- B. Anosmin
- C. Migrin
- D. Neurokinin

Kallmann syndrome is an X-linked disorder due to mutations in KAL1 gene, which encodes anosmin, a protein that mediates migration of neural progenitors of the olfactory bulb & GnRH-producing neurons. These individuals have GnRH deficiency and variable combinations of anosmia or hyposmia, renal defects, and neurologic abnormalities including mirror movements.

903 Prader-Willi syndrome is characterized by all except ?

Harrison's 18th Ed. 3017

- A. Obesity
- B. Hypotonic musculature
- C. Tall stature
- D. Mental retardation

904 Prader-Willi syndrome is characterized by all except ?

Harrison's 18th Ed. 3017

- A. Hypogonadism
- B. Lean and thin constitution
- C. Short stature
- D. Small hands and feet

Prader-Willi syndrome is characterized by obesity, hypotonic musculature, mental retardation, hypogonadism, short stature & small hands & feet. Prader-Willi syndrome is a genomic imprinting disorder.

905 Laurence-Moon syndrome is transmitted as ?

Harrison's 18th Ed. 3017

- A. X-linked
- B. Autosomal recessive
- C. Autosomal dominant
- D. Autosomal codominant

906 Laurence-Moon syndrome is characterized by all except ?

Harrison's 18th Ed. 3017

- A. Obesity
- B. Hypogonadism
- C. Short stature
- D. Mental retardation

907 Laurence-Moon syndrome is characterized by all except ?

Harrison's 18th Ed. 3017

- A. Polydactyly
- B. Retinitis pigmentosa
- C. Mental retardation
- D. Small hands and feet

Laurence-Moon syndrome is an autosomal recessive disorder characterized by obesity, hypogonadism, mental retardation, polydactyly & retinitis pigmentosa. Recessive mutations of leptin, or its receptor, cause severe obesity & pubertal arrest because of hypothalamic GnRH deficiency.

908 Mechanism of marijuana-induced hypogonadism is ?

Harrison's 18th Ed. 3017

- A. Androgen deficiency
- B. Decreased GnRH secretion
- C. Cytokine and/or glucocorticoid effects
- D. All of the above

Mechanism of marijuana-induced hypogonadism is decreased GnRH secretion. Gynecomastia in marijuana users is caused by plant estrogens in crude preparations.

909 Which of the following is false in obesity ?

Harrison's 18th Ed. 3018

- A. Decrease in SHBG levels
- B. Normal free testosterone levels
- C. Higher estradiol levels
- D. None of the above

In obesity, SHBG levels decrease due to inhibitory effect of increased circulating insulin resulting in lower total testosterone levels but not free testosterone levels. Estradiol levels are elevated due to aromatization of testosterone to estradiol in adipose tissue.

910 Which of the following is a cause of hypogonadism ?

Harrison's 18th Ed. 3018

- A. Pituitary adenoma
- B. Craniopharyngioma
- C. Hemochromatosis
- D. All of the above

Pituitary adenomas can cause hypogonadism by extension into suprasellar region & impairing GnRH secretion & mildly increasing PRL secretion. Craniopharyngioma should be suspected when sellar mass, diabetes insipidus, hypogonadism coexist. In hemochromatosis, pituitary is affected more than testis by excessive iron deposition leading to hypogonadism.

911 Hypogonadism can be caused by ?

Harrison's 18th Ed. 3018

- A. Anorchia syndrome
- B. Myotonic dystrophy
- C. Klinefelter syndrome
- D. All of the above

Neurologic diseases associated with altered testicular function are myotonic dystrophy, spinobulbar muscular atrophy, and paraplegia.

912 The occurrence of Klinefelter syndrome is ?

Harrison's 18th Ed. 3018

- A. 1 in 1000 live-born males
- B. 1 in 10000 live-born males
- C. 1 in 100000 live-born males
- D. 1 in 1000000 live-born males

Klinefelter syndrome is the most common chromosomal disorder associated with testicular dysfunction & male infertility. It occurs in ~ 1 in 1000 live-born males.

913 Which of the following is a feature of Klinefelter syndrome ?

Harrison's 18th Ed. 3018

- A. Gynecomastia
- B. Decreased Testosterone
- C. Increased estradiol
- D. All of the above

Azoospermia is the rule in men with Klinefelter syndrome (47,XXY). Testicular histology shows absence of spermatogenesis. Number of Leydig cells is increased. Testosterone is decreased & estradiol is increased, leading to undervirilization & gynecomastia.

914 Men with Klinefelter syndrome are at a reduced risk of ?

Harrison's 18th Ed. 3018

- A. Breast cancer
- B. Non-Hodgkin's lymphoma
- C. Lung cancer
- D. Prostate cancer

Men with Klinefelter syndrome are at increased risk of breast cancer, non-Hodgkin's lymphoma & lung cancer but reduced risk of prostate cancer.

915 Genotype in classic form of Klinefelter syndrome is ?

Harrison's 18th Ed. 3018

- A. 47,XXY
- B. 46,XY
- C. 47,XXY
- D. 48,XXYY

916 Hormone profile in Klinefelter syndrome includes all except ?

Harrison's 18th Ed. 3018

- A. Increased FSH
- B. Increased LH
- C. Decreased estradiol
- D. Decreased testosterone

917 Clinical features of Klinefelter syndrome includes all except ?

Harrison's 18th Ed. 3018

- A. Gynecomastia
- B. Normal sized testes
- C. Infertility
- D. Eunuchoid features

918 Which of the following is the most frequent karyotype in Turner syndrome (TS) ?

Harrison's 16th Ed. 2215

- A. 45,X
- B. 46,XX
- C. 45,X
- D. X fragments

919 Turner syndrome is characterized by all except ?

Harrison's 16th Ed. 2215

- A. Phenotypic females
- B. Short stature
- C. Primary amenorrhea
- D. Gynecomastia

920 In an adult female with Turner syndrome, which of the following is not found ?

Harrison's 16th Ed. 2216

- A. Hypertension
- B. Osteoporosis
- C. Chronic pancreatitis
- D. Inflammatory bowel disease

921 Gonadal dysgenesis & renal dysfunction occurs due to mutations in which of the following genes ?

Harrison's 16th Ed. 2218

- A. WT1

- B. SF1
- C. SOX9
- D. All of the above

922 Gonadal dysgenesis & primary adrenal failure occurs due to mutations in which of the following genes ?

Harrison's 16th Ed. 2218

- A. WT1
- B. SOX9
- C. SF1
- D. All of the above

923 Gonadal dysgenesis & campomelic dysplasia occurs due to mutations in which of the following genes ?

Harrison's 16th Ed. 2218

- A. WT1
- B. SOX9
- C. SF1
- D. All of the above

924 Viral orchitis may be caused by ?

Harrison's 18th Ed. 3018

- A. Mumps virus
- B. Echovirus
- C. Lymphocytic choriomeningitis virus
- D. All of the above

Viral orchitis may be caused by mumps virus, echovirus, lymphocytic choriomeningitis virus & group B arboviruses.

925 Orchitis occurs in what percentage of adult men with mumps ?

Harrison's 18th Ed. 3018

- A. 10 %
- B. 25 %
- C. 50 %
- D. 75 %

Orchitis occurs in as many as one-fourth of adult men with mumps.

926 At what dose of radiation, oligospermia or azoospermia develops ?

Harrison's 18th Ed. 3019

- A. 20 rad
- B. 40 rad
- C. 60 rad
- D. 80 rad

Radiation dose of 20 rad damages spermatogonia resulting in increased FSH & LH levels. Higher dose (80 rad) causes azoospermia. After therapeutic radiation, permanent androgen deficiency is uncommon.

927 Which of the following inhibits testosterone synthesis ?

Harrison's 18th Ed. 3019

- A. Spironolactone
- B. Ketoconazole
- C. Marijuana
- D. All of the above

928 Which of the following blocks androgen action ?

Harrison's 18th Ed. 3019

- A. Spironolactone

- B. Ketoconazole
- C. Marijuana
- D. All of the above

Ketoconazole inhibits testosterone synthesis, spironolactone blocks androgen action, marijuana increases estrogen and chemotherapy directly inhibits spermatogenesis.

929 Pituitary tumors in Carney complex secrete which of the following hormones ?

Harrison's 18th Ed. 3019

- A. GH
- B. Prolactin
- C. ACTH
- D. Vasopressin

Acromegaly occurs in about 20% of patients of Carney complex.

930 Which of the following tumors occur in Carney complex ?

Harrison's 18th Ed. 3019

- A. Testicular
- B. Adrenal
- C. Pituitary
- D. All of the above

Carney complex is characterized by spotty skin pigmentation, myxomas, and testicular, adrenal, and pituitary tumors.

931 In Carney syndrome, mutation occurs in which of the following gene ?

Harrison's 16th Ed. 2081

- A. PRKA1A
- B. PRKA1B
- C. PRKA1C
- D. PRKA1D

Carney syndrome patients have mutations in the R1 α regulatory subunit of protein kinase A (PRKAR1A) on chromosome 17q.

932 Which of the following is a feature of Carney syndrome ?

Harrison's 18th Ed. 3019

- A. Myxoma
- B. Colour blindness
- C. Flat foot
- D. Hypothyroidism

Carney syndrome is characterized by myxomas of heart, skin, and breast.

933 Which of the following is not a feature of Peutz-Jeghers syndrome ?

Harrison's 16th Ed. 302, 553

- A. Mucocutaneous pigmentation
- B. Intestinal polyps
- C. Leydig cell tumors in men
- D. Ovarian sex cord stromal tumors

Sertoli cell tumor in men is a feature of the autosomal dominant Peutz-Jeghers syndrome. Lentigines in these patients are located around nose & mouth, hands and feet, and oral cavity. Gastrointestinal polyps may become malignant.

934 What should be the diameter of glandular breast tissue in true gynecomastia ?

Harrison's 18th Ed. 3019

- A. > 1 cm

- B. > 2 cm
- C. > 3 cm
- D. > 4 cm

Gynecomastia means enlargement of male breast glandular tissue & not excess adipose tissue. Ratio of estrogen/androgen is increased. True gynecomastia is associated with glandular breast tissue that is >4 cm in diameter & often tender.

935 Gynecomastia occurs as a normal physiologic phenomenon in ?

Harrison's 18th Ed. 3019

- A. Newborn
- B. During puberty
- C. With aging
- D. All of the above

Glandular breast tissue is firmer, contains fibrous-like cords & is often tender. Prevalence of gynecomastia increases with age & BMI because of increased aromatase activity in adipose tissue that converts adrenal and gonadal androgens and its precursors to estrogen.

936 Drugs that can cause gynecomastia include all except ?

Harrison's 18th Ed. 3019

- A. Digitalis
- B. Quinidine
- C. Ketoconazole
- D. Spironolactone

Digitalis acts directly as estrogenic substance, ketoconazole inhibits androgen synthesis, and spironolactone inhibits androgen action.

937 Which of the following conditions do not cause galactorrhea ?

Harrison's 15th Ed. Chapter 337

- A. Bronchogenic carcinoma
- B. Hypernephroma
- C. Choriocarcinoma
- D. Pancreatic carcinoma

938 Which of the following drugs do not cause galactorrhoea ?

Harrison's 15th Ed. Chapter 337

- A. Metoclopramide
- B. Sertraline
- C. Atenolol
- D. Verapamil

939 Which of the following drugs do not cause galactorrhoea ?

Harrison's 15th Ed. Chapter 337

- A. Reserpine
- B. Paroxetine
- C. Methyl dopa
- D. Metformin

940 Which of the following endocrine conditions can cause galactorrhoea ?

Harrison's 15th Ed. Chapter 337

- A. Cushing's disease
- B. Hyperthyroidism
- C. Hypothyroidism
- D. All of the above

941 Gynecomastia of digitalis ingestion occurs most commonly in men with ?

Harrison's 15th Ed. Chapter 337

- A. Abnormal liver function
- B. Abnormal kidney function
- C. Abnormal cardiac function
- D. All of the above

942 Drug-induced gynecomastia is due to all except ?

Harrison's 15th Ed. Chapter 337

- A. Clomiphene
- B. Ketoconazole
- C. Spironolactone
- D. Rifampin

943 Drug-induced gynecomastia is due to all except ?

Harrison's 15th Ed. Chapter 337

- A. Cimetidine
- B. Omeprazole
- C. Ranitidine
- D. Metoclopramide

944 Drug-induced gynecomastia is due to all except ?

Harrison's 15th Ed. Chapter 337

- A. Methyldopa
- B. Calcium channel blocking agents
- C. Angiotensin-converting enzyme inhibitors
- D. Beta blockers

945 Drug-induced gynecomastia is due to all except ?

Harrison's 15th Ed. Chapter 337

- A. Tricyclic antidepressants
- B. Sibutramine
- C. Antiretroviral agents
- D. Penicillamine

946 Excess estrogen production may be caused by tumors in association with ?

Harrison's 16th Ed. 2192

- A. Sertoli cell
- B. Peutz-Jegher syndrome
- C. Carney complex
- D. All of the above

947 Drug that causes gynecomastia by acting directly as estrogenic substance is ?

Harrison's 16th Ed. 2192

- A. Oral contraceptive
- B. Phytoestrogen
- C. Digitalis
- D. All of the above

948 Which of the following drugs is known to cause anaphylaxis and angioedema ?

Harrison's 15th Ed. Table 71-2

- A. ACE inhibitors

B. Intravenous immune globulin

C. Insulin

D. Streptomycin

949 Galactorrhea is not caused by ?

Harrison's 15th Ed. Table 71-2

- A. Domperidone
- B. Methyldopa
- C. Tricyclic antidepressants
- D. Clomiphene

950 Gynecomastia is not caused by ?

Harrison's 15th Ed. Table 71-2

- A. Calcium channel antagonists
- B. Digitalis
- C. Testosterone
- D. Metoclopramide

951 Hyperglycemia is not caused by ?

Harrison's 15th Ed. Table 71-2

- A. Chlorthalidone
- B. HIV-protease inhibitors
- C. Phenytoin
- D. ACE inhibitors

952 Hyperkalemia is not caused by ?

Harrison's 15th Ed. Table 71-2

- A. ACE inhibitors
- B. Heparin
- C. Lithium
- D. Theophylline

953 Which of the following is an aromatase inhibitor ?

Harrison's 16th Ed. 2193

- A. Anastrozole
- B. Fadrozole
- C. Fromestane
- D. All of the above

954 Fetuses with which of the following chromosomal pattern are not viable ?

Harrison's 16th Ed. 2214

- A. 47,XXY
- B. 48,XXXY
- C. 45,X
- D. 45,Y

955 Anti-mullerian hormone (AMH) is secreted by ?

Harrison's 16th Ed. 2214

- A. Leydig cells
- B. Sertoli cells
- C. Ovarian follicles
- D. All of the above

956 Wolffian structures include all except ?

Harrison's 16th Ed. 2215

- A. Epididymides
- B. Vasa deferentia
- C. Seminal vesicles
- D. Prostate

957 Mullerian ducts forms all except ?

Harrison's 16th Ed. 2215

- A. Fallopian tubes
- B. Uterus
- C. Upper vagina
- D. Lower vagina

958 Prostate develops from ?

Harrison's 16th Ed. 2215

- A. Genital tubercle
- B. Urogenital sinus
- C. Urogenital swelling
- D. All of the above

959 Aromatase inhibitors include all except ?

Harrison's 16th Ed. 2193

- A. Tamoxifen
- B. Anastrozole
- C. Testolactone
- D. Fromestane

Tamoxifen is an antiestrogen. Testolactone is a relatively weak aromatase inhibitor.

960 Which of the following statements about age related hormone status is false ?

Harrison's 18th Ed. 3020

- A. Testosterone levels decrease with age
- B. SHBG levels are higher in older men
- C. Gradual rise of LH levels with age
- D. None of the above

961 Which of the following diseases increase in occurrence in offspring of men who are advanced in age ?

Harrison's 18th Ed. 3021

- A. Achondroplasia
- B. Polyposis coli
- C. Marfan syndrome
- D. All of the above

Incidence of autosomal dominant diseases like achondroplasia, polyposis coli, Marfan syndrome & Apert's syndrome increases in offspring of men who are advanced in age (sporadic missense mutations).

962 In a patient with symptoms or signs of androgen deficiency, what level of total testosterone denotes testosterone deficiency ?

Harrison's 18th Ed. 3021

- A. < 300 ng/dL
- B. < 400 ng/dL
- C. < 600 ng/dL
- D. < 800 ng/dL

963 What level of total testosterone excludes testosterone deficiency ?

Harrison's 18th Ed. 3021

- A. > 50 ng/dL

- B. > 150 ng/dL
- C. > 250 ng/dL
- D. > 350 ng/dL

964 Samples for testosterone estimation are obtained in ?

Harrison's 18th Ed. 3021

- A. Early-morning
- B. Noon
- C. Evening
- D. Midnight

Suspicion of androgen deficiency prompts measurement of total testosterone, preferably in morning. Total testosterone level <300 ng/dL in association with symptoms is evidence of testosterone deficiency. Early-morning testosterone level >350 ng/dL makes diagnosis of androgen deficiency unlikely.

965 Which of the following is not a cause of primary testicular failure ?

Harrison's 18th Ed. 3021

- A. Klinefelter syndrome
- B. HIV infection
- C. Hemochromatosis
- D. Prior infectious orchitis

966 Which of the following is not a cause of primary testicular failure ?

Harrison's 18th Ed. 3021

- A. Klinefelter syndrome
- B. Cancer chemotherapeutic agents
- C. Prior infectious orchitis
- D. Hyperprolactinemia

Common causes of primary testicular dysfunction include Klinefelter syndrome, uncorrected cryptorchidism, cancer chemotherapy, radiation to testes, trauma, torsion, infectious orchitis, HIV infection, anorchia syndrome & myotonic dystrophy.

967 Which of the following is not a cause of acquired hypogonadotropic hypogonadism ?

Harrison's 18th Ed. 3021

- A. Space-occupying lesions of sella
- B. Hyperprolactinemia
- C. Hemochromatosis
- D. Prior infectious orchitis

968 Which of the following is not a cause of acquired hypogonadotropic hypogonadism ?

Harrison's 18th Ed. 3021

- A. Chronic illness
- B. Excessive exercise
- C. Substance abuse
- D. Uncorrected cryptorchidism

Common causes of acquired secondary hypogonadism include space-occupying lesions of the sella, hyperprolactinemia, chronic illness, hemochromatosis, excessive exercise, and substance abuse.

969 Human menopausal gonadotropin (hMG) contains ?

Harrison's 18th Ed. 3022

- A. FSH
- B. LH
- C. FSH & LH
- D. None of the above

970 Human menopausal gonadotropin (hMG) is derived from which of the following of postmenopausal women ?

Harrison's 18th Ed. 3022

- A. Urine
- B. Blood
- C. Saliva
- D. Any of the above

Human menopausal gonadotropin (hMG) is purified from urine of postmenopausal women and contains FSH & LH.

971 Which of the following is useful in restoring spermatogenesis ?

Harrison's 18th Ed. 3022

- A. FSH
- B. LH
- C. hCG
- D. All of the above

972 When drugs are used to restore spermatogenesis, testosterone levels should be raised to ?

Harrison's 18th Ed. 3022

- A. Low-normal range
- B. Mid-normal range
- C. High-normal range
- D. Any of the above

Drugs used to restore spermatogenesis should bring testosterone levels into the mid-normal range.

973 After 6 months of hCG alone therapy, if testosterone levels are in mid-normal range and sperm concentrations are low, which of the following should be done ?

Harrison's 18th Ed. 3022

- A. Increase dose of hCG
- B. Add LH
- C. Add FSH
- D. Any of the above

FSH is available as hMG, highly purified urinary hFSH, or recombinant hFSH.

974 Which of the following is a mandatory requirement of GnRH therapy ?

Harrison's 18th Ed. 3022

- A. Documented GnRH deficiency
- B. Normal pituitary function
- C. Normal testicular function
- D. All of the above

In documented GnRH deficiency, both pubertal development & spermatogenesis can be successfully induced by pulsatile administration of low doses of GnRH. This response requires normal pituitary & testicular function.

975 Androgen therapy can be given in all except ?

Harrison's 18th Ed. 3024

- A. Bone marrow failure
- B. Hereditary angioedema
- C. Endometriosis
- D. Sleep apnea

Testosterone should not be given in prostate cancer, benign prostatic hypertrophy, to men with baseline hematocrit $\geq 50\%$ and sleep apnea syndrome.

976 Test for assessing the adequacy of testosterone replacement is ?

Harrison's 18th Ed. 3024

- A. Measurements of testosterone levels
- B. Measurements of LH
- C. Measurements of FSH
- D. All of the above

LH & FSH estimation are not useful in assessing adequacy of testosterone replacement. Testosterone should be measured 3 months after initiating therapy to assess adequacy of therapy.

977 Most frequent adverse event reported in testosterone trials in middle-aged and older men is ?

Harrison's 18th Ed. 3025

- A. Rise in PSA levels
- B. Erythrocytosis
- C. Cholestasis
- D. Pruritis

Erythrocytosis is the most frequent adverse event reported in testosterone trials in middle-aged and older men and is also the most frequent cause of treatment discontinuation in these trials.

978 Androgenic steroids used by athletes is ?

Harrison's 18th Ed. 3026

- A. Nandrolone
- B. Stanozolol
- C. Methandienone
- D. All of the above

Commonly used androgenic steroids by athletes include testosterone esters, nandrolone, stanozolol, methandienone & methenolol.

979 In athletes, stacking refers to ?

Harrison's 18th Ed. 3026

- A. Withdrawal symptoms of androgenic steroids
- B. Increasing doses of single androgenic steroid
- C. Increasing doses of multiple androgenic steroids
- D. Rage reactions with of androgenic steroids

Athletes use increasing doses of multiple steroids in a practice known as stacking.

980 Muscle-building or performance-enhancing agents include ?

Harrison's 18th Ed. 3026

- A. IGF-1
- B. Insulin
- C. Thyroxine
- D. All of the above

Drugs perceived to be muscle-building or performance-enhancing include growth hormone, IGF-1, insulin, amphetamine, clenbuterol, ephedrine and thyroxine.

981 Method for detecting androgen abuse is ?

Harrison's 18th Ed. 3027

- A. Gas chromatography-mass spectrometry
- B. Liquid chromatography-mass spectrometry
- C. High-resolution mass spectrometry
- D. All of the above

Gas chromatography-mass spectrometry, liquid chromatography-mass spectrometry, high-resolution mass spectrometry and tandem mass spectrometry are of use in detecting androgen abuse.

982 Illicit testosterone use is detected by measurement of ?

Harrison's 18th Ed. 3027

- A. Urinary testosterone
- B. Urinary epitestosterone
- C. Urinary testosterone to epitestosterone ratio
- D. Urinary testosterone to serum testosterone ratio

Exogenous testosterone administration increases urinary testosterone glucuronide excretion & consequently testosterone to epitestosterone ratio. Ratios > 6 suggest exogenous testosterone use.

983 Illicit testosterone use is confirmed by measurement of ?

Harrison's 18th Ed. 3027

- A. Urinary ¹³C : ¹²C ratio in testosterone
- B. Urinary ¹¹C : ¹²C ratio in testosterone
- C. Urinary ¹⁰C : ¹¹C ratio in testosterone
- D. Urinary ⁹C : ¹⁰C ratio in testosterone

Exogenous testosterone use is confirmed by estimating ¹³C : ¹²C ratio in testosterone by isotope ratio combustion mass spectrometry. Synthetic testosterone has a lower ¹³C : ¹²C ratio than endogenously produced testosterone.

Chapter 347. The Female Reproductive System, Infertility, and Contraception

984 Fetuses weighing less than what are termed abortuses ?

- A. 500 grams
- B. 600 grams
- C. 750 grams
- D. 1000 grams

Fetuses weighing < 500 grams are not considered as births, but are termed abortuses for purposes of vital statistics.

985 Birth rate is expressed as ?

- A. Number of live births per 1000 population
- B. Number of live births per 10000 population
- C. Number of live births per 100000 population
- D. Number of live births per 1000000 population

986 Fertility rate of females is calculated between what age range ?

- A. 15 to 40 years
- B. 15 to 44 years
- C. 15 to 46 years
- D. 15 to 48 years

Fertility rate of females is the number of live births per 1000 females aged 15 through 44 years.

987 Early neonatal death refers to ?

- A. During the first day after birth
- B. During the first 3 days after birth
- C. During the first 7 days after birth
- D. During the first 10 days after birth

988 Late neonatal death refers to ?

- A. Death after 7 days but before 14 days
- B. Death after 7 days but before 21 days
- C. Death after 7 days but before 29 days

D. Death after 7 days but before 42 days

Early neonatal death refers to death of a liveborn neonate during the first 7 days after birth. Late neonatal death refers to death after 7 days but before 29 days.

989 Neonatal mortality rate refers to ?

- A. Number of neonatal deaths per 100 live births
- B. Number of neonatal deaths per 1000 live births
- C. Number of neonatal deaths per 10000 live births
- D. Number of neonatal deaths per 100000 live births

990 Perinatal mortality rate refers to ?

- A. Number of neonatal deaths per 1000 total births
- B. Number of stillbirths + neonatal deaths per 1000 total births
- C. Number of neonatal deaths per 10000 total births
- D. Number of stillbirths + neonatal deaths per 10000 total births

Perinatal mortality rate is number of stillbirths + neonatal deaths per 1000 total births.

991 Infant death refers to all deaths of liveborn infants from birth to ?

- A. 3 months of age
- B. 6 months of age
- C. 9 months of age
- D. 12 months of age

Infant death refers to all deaths of liveborn infants from birth to 12 months of age.

992 Infant mortality rate is the number of infant deaths per

- A. 100 live births
- B. 1000 live births
- C. 10000 live births
- D. 100000 live births

Infant mortality rate is the number of infant deaths per 1000 live births.

993 Low-birthweight is a newborn whose weight is less than ?

- A. 500 grams
- B. 1000 grams
- C. 1500 grams
- D. 2500 grams

Low-birthweight is a newborn whose weight is less than 2500 grams.

994 Very low-birthweight is a newborn whose weight is less than ?

- A. 500 grams
- B. 1000 grams
- C. 1500 grams
- D. 2500 grams

Very low-birthweight is a newborn whose weight is less than 1500 grams.

995 Extremely low-birthweight is a newborn whose weight is less than ?

- A. 500 grams
- B. 1000 grams
- C. 1500 grams
- D. 2500 grams

Extremely low-birthweight is a newborn whose weight is less than 1000 grams.

996 Term neonate is a neonate born after how many days of pregnancy ?

- A. 245 to 284 days
- B. 252 to 290 days
- C. 260 to 294 days
- D. 268 to 298 days

Term neonate is a neonate born anytime after 37 completed weeks of gestation and up until 42 completed weeks of gestation (260 to 294 days).

997 Preterm neonate is a neonate born before how many days of pregnancy ?

- A. 248 days
- B. 252 days
- C. 259 days
- D. 261 days

Preterm neonate is a neonate born before 37 completed weeks (259th day).

998 Post-term neonate is a neonate born on or after how many days of pregnancy ?

- A. 294 days
- B. 295 days
- C. 296 days
- D. 297 days

Postterm neonate is a neonate born anytime after completion of 42nd week, beginning with day 295.

999 Abortus is fetus or embryo removed or expelled from uterus maximally before ?

- A. 16 weeks of gestation
- B. 18 weeks of gestation
- C. 20 weeks of gestation
- D. 22 weeks of gestation

Abortus is a fetus or embryo removed or expelled from uterus during the first half of gestation i.e. 20 weeks or less and weighing less than 500 grams.

1000 Maternal mortality ratio is the number of maternal deaths that result from reproductive process per ?

- A. 1000 live births
- B. 10000 live births
- C. 100000 live births
- D. 1000000 live births

Maternal mortality ratio is the number of maternal deaths that result from the reproductive process per 100,000 live births.

1001 Which of the following statements is false ?

Harrison's 16th Ed. 31

- A. Adaptive immune responses are more robust in women than in men
- B. Estrogens have stimulatory actions on cellular immunity
- C. Androgens have inhibitory actions on cellular immunity
- D. None of the above

1002 Which of the following statements is false ?

Harrison's 16th Ed. 31

- A. Women have lower total body water than men
- B. Women awaken from anesthesia faster than men given the same doses of anesthetics

C. Women require lower doses of neuroleptics to control schizophrenia

D. Women have lower frequency of adverse drug reactions than men

1003 What percentage of women suffer from depression during pregnancy and postpartum period ?

Harrison's 16th Ed. 31

- A. 5 %
- B. 10 %
- C. 25 %
- D. 40 %

1004 In pregnancy, cardiac output increases by ?

Harrison's 17th Ed. 44

- A. 10 %
- B. 20 %
- C. 30 %
- D. 40 %

Increase in CO is due to increase in stroke volume. Heart rate increases by about 10 beats per minute during the third trimester.

1005 During pregnancy, what value of blood pressure is considered as abnormally elevated and is associated with a marked increase in perinatal morbidity and mortality ?

Harrison's 17th Ed. 44

- A. 130 / 80 mmHg
- B. 130 / 90 mmHg
- C. 140 / 80 mmHg
- D. 140 / 90 mmHg

1006 In all pregnant women, measurement of BP should be performed in which position ?

Harrison's 17th Ed. 44

- A. Supine
- B. Sitting
- C. Standing
- D. Any of the above

During pregnancy, a BP of 140/90 mmHg is considered as abnormally elevated & is associated with increase in perinatal morbidity & mortality. In all pregnant women, measurement of BP should be performed in the sitting position, because for many the lateral recumbent position is associated with a blood pressure lower than that recorded in sitting position. Diagnosis of hypertension requires measurement of two elevated BP, at least 6 hours apart. Hypertension during pregnancy is usually caused by preeclampsia, chronic hypertension, gestational hypertension, or renal disease.

1007 What percentage of pregnant women suffer from preeclampsia ?

Harrison's 17th Ed. 44

- A. 2 to 3 %
- B. 5 to 7 %
- C. 12 to 15 %
- D. 15 to 18 %

~5 - 7% of all pregnant women develop preeclampsia, the new onset of hypertension (BP >140/90 mmHg) and proteinuria (>300 mg/day) after 20 weeks of gestation.

1008 Which of the following contributes to endothelial dysfunction, hypertension, and proteinuria in preeclampsia ?

Harrison's 17th Ed. 44

- A. fms-like tyrosine kinase 1
- B. fms-like tyrosine kinase 2

- C. fms-like tyrosine kinase 3
- D. fms-like tyrosine kinase 4

Excessive placental secretion of a soluble fms-like tyrosine kinase 1, a naturally occurring vascular endothelial growth factor antagonist, and decreased secretion of placental growth factor may contribute to endothelial dysfunction, hypertension & proteinuria observed in preeclampsia.

1009 Stroke in preeclampsia may occur at ?

Harrison's 17th Ed. 44

- A. Sub-normal blood pressures
- B. Near-normal blood pressures
- C. Hypertension range blood pressures
- D. Any of the above

Preeclampsia is associated with abnormalities of cerebral circulatory autoregulation, which increase the risk of stroke at near-normal blood pressures.

1010 Risk factors for development of preeclampsia include all except ?

Harrison's 17th Ed. 44

- A. Multiparity
- B. Diabetes mellitus
- C. History of renal disease
- D. Chronic hypertension

1011 Risk factors for development of preeclampsia include all except ?

Harrison's 17th Ed. 44

- A. Prior history of preeclampsia
- B. Extremes of maternal age (>35 years or <15 years)
- C. Low BMI
- D. Factor V Leiden mutation

1012 Risk factor for development of preeclampsia is ?

Harrison's 17th Ed. 44

- A. Angiotensinogen gene T235
- B. Antiphospholipid antibody syndrome
- C. Multiple gestation
- D. All of the above

Risk factors for the development of preeclampsia include nulliparity, diabetes mellitus, a history of renal disease or chronic hypertension, prior history of preeclampsia, extremes of maternal age (>35 years or <15 years), obesity, factor V Leiden mutation, angiotensinogen gene T235, G20210A prothrombin gene mutation, antiphospholipid antibody syndrome & multiple gestation.

1013 To define severe preeclampsia, which of the following is false ?

Harrison's 17th Ed. 44

- A. New-onset hypertension
- B. Severe proteinuria
- C. Central nervous system dysfunction
- D. None of the above

1014 For the diagnosis of "severe preeclampsia", the blood pressure must be above ?

Harrison's 17th Ed. 44

- A. 120 / 80 mmHg
- B. 130 / 90 mmHg
- C. 140 / 100 mmHg
- D. 160 / 110 mmHg

Severe preeclampsia is the presence of new-onset hypertension and proteinuria accompanied by CNS dysfunction (headaches, blurred vision, seizures, coma), marked elevations of BP (>160/110 mmHg), severe proteinuria (>5 g/day), oliguria or renal failure, pulmonary edema, hepatocellular injury (ALT > 2 x the upper limits of normal), thrombocytopenia (platelet count < 100,000/L), or disseminated intravascular coagulation.

1015 In HELLP syndrome, "H" stands for ?

Harrison's 17th Ed. 44

- A. Hemolysis
- B. Hemorrhage
- C. Hepatitis
- D. Hypertension

HELLP (hemolysis, elevated liver enzymes, low platelets) syndrome is a special subgroup of severe preeclampsia which increases morbidity & mortality. Presence of platelet dysfunction & coagulation disorders further increases the risk of stroke.

1016 For women with severe preeclampsia, delivery is recommended after how many weeks of gestation ?

Harrison's 16th Ed. 33

- A. 28 weeks
- B. 32 weeks
- C. 36 weeks
- D. Any of the above

Definitive treatment of preeclampsia is delivery of fetus & placenta. For pregnant women with preeclampsia before 37 weeks' gestation, delivery reduces mother's morbidity but exposes fetus to risk of premature delivery.

1017 Drug that can be used to manage hypertension in severe preeclampsia is ?

Harrison's 17th Ed. 44

- A. Labetalol
- B. Hydralazine
- C. Calcium channel blocker
- D. Any of the above

Aggressive management of blood pressures > 160/110 mmHg in severe preeclampsia reduces the risk of cerebrovascular accidents. IV labetalol or hydralazine and calcium channel blockers are drugs most commonly used. Raised BP should be reduced slowly to avoid hypotension & a decrease in blood flow to fetus. Angiotensin-converting enzyme (ACE) inhibitors as well as angiotensin-receptor blockers should be avoided in the second and third trimesters of pregnancy because of their adverse effects on fetal development.

1018 Drug of choice for prevention & treatment of eclamptic seizures is ?

Harrison's 17th Ed. 44

- A. Labetalol
- B. Hydralazine
- C. Calcium channel blocker
- D. Magnesium sulfate

Magnesium sulfate is better than phenytoin & diazepam and is the treatment of choice for prevention & treatment of eclamptic seizures.

1019 Magnesium prevents seizures by interacting with which of the following in central nervous system ?

Harrison's 17th Ed. 44

- A. GABA receptors
- B. Glutamate receptors
- C. N-methyl-D-aspartate (NMDA) receptors
- D. Dopamine receptors

Magnesium prevents seizures by interacting with N-methyl-D-aspartate (NMDA) receptors in CNS.

1020 Pregnant women with chronic hypertension are at increased risk for all except ?

Harrison's 17th Ed. 45

- A. Intrauterine growth restriction

- B. Superimposed preeclampsia
- C. Abruptio placenta
- D. Post partum hemorrhage

Pregnancy complicated by chronic essential hypertension is associated with intrauterine growth restriction, increased perinatal mortality, superimposed preeclampsia & abruptio placenta.

1021 Which of the following drugs is most commonly used for treatment of chronic hypertension in pregnancy ?

Harrison's 17th Ed. 45

- A. Hydralazine
- B. Labetalol
- C. Beta blocker
- D. Diuretic

Alpha methyl dopa, labetalol & nifedipine are the most commonly used medications for the treatment of chronic hypertension in pregnancy.

1022 What percentage of all aortic dissections in women under 40 years of age occur during pregnancy ?

Harrison's 16th Ed. 78

- A. About 25 %
- B. About 33 %
- C. About 50 %
- D. About 75 %

1023 In "Gestational Hypertension", the blood pressure is elevated during which trimester of pregnancy ?

Harrison's 17th Ed. 45

- A. First
- B. Second
- C. Third
- D. Any time during pregnancy

This is the development of elevated blood pressure during pregnancy or in the first 24 hours post partum in the absence of preexisting chronic hypertension and other signs of preeclampsia.

1024 Valvular disease most likely to cause death during pregnancy is ?

Harrison's 17th Ed. 45

- A. Mitral stenosis
- B. Mitral regurgitation
- C. Aortic stenosis
- D. Aortic regurgitation

Mitral stenosis is the valvular disease most likely to cause death during pregnancy. Mitral regurgitation, aortic regurgitation & stenosis are well tolerated during pregnancy.

1025 In pregnant women, DVT occurs much more commonly in ?

Harrison's 17th Ed. 46

- A. Left leg
- B. Right leg
- C. Left arm
- D. Right arm

In pregnant women, DVT occurs more commonly in left leg than in right leg, due to compression of left iliac vein by iliac artery and the uterus.

1026 Genetic mutations associated with DVT during pregnancy include ?

Harrison's 17th Ed. 46

- A. Factor V Leiden mutation

- B. Prothrombin G20210A mutation (hetero- & homozygotes)
- C. Methylenetetrahydrofolate reductase C677T mutation (homozygotes)
- D. All of the above

Activated protein C resistance caused by factor V Leiden mutation increases risk of DVT, pulmonary embolism & severe preeclampsia during pregnancy. Prothrombin G20210A mutation (heterozygotes & homozygotes) & methylenetetrahydrofolate reductase C677T mutation (homozygotes) also increases risk of DVT.

1027 Which of the following is false for women with artificial valves contemplating pregnancy ?

Harrison's 16th Ed. 34

- A. Warfarin be stopped & heparin initiated prior to conception
- B. Prophylaxis against thrombosis with low-molecular-weight heparin (LMWH) is not recommended
- C. Prophylaxis with unfractionated heparin is recommended
- D. None of the above

1028 Warfarin therapy during the first trimester of pregnancy is associated with ?

Harrison's 17th Ed. 46

- A. Fetal chondrodysplasia punctata
- B. Fetal optic atrophy
- C. Mental retardation
- D. All of the above

Warfarin therapy is contraindicated in the 1st trimester due to its association with fetal chondrodysplasia punctata. In 2nd & 3rd trimesters, warfarin may cause fetal optic atrophy and mental retardation.

1029 Which of the following about DVT in pregnancy is false ?

Harrison's 17th Ed. 46

- A. LMWH or unfractionated heparin can be used for anticoagulation
- B. Warfarin therapy is contraindicated
- C. Warfarin is contraindicated in breast-feeding women
- D. DVT can occur in postpartum period

Warfarin is not contraindicated in breast-feeding women. During pregnancy, warfarin is teratogenic & should be avoided.

1030 When DVT occurs in the postpartum period, warfarin is given for ?

Harrison's 17th Ed. 46

- A. 1 - 3 months
- B. 3 - 6 months
- C. 6 - 9 months
- D. 9 - 12 months

When DVT occurs in the postpartum period, LMWH therapy for 7 - 10 days may be followed by warfarin therapy for 3 - 6 months.

1031 Which of the following is false in pregnancy ?

Harrison's 17th Ed. 46

- A. Fasting plasma glucose is lower by 15 - 20 mg/dL
- B. Fasting plasma hydroxybutyrate higher
- C. Fasting plasma acetoacetate higher
- D. None of the above

Pregnancy is a state of accelerated starvation & ketosis. In pregnancy, fasting plasma glucose is lower by 15 - 20 mg/dL than in nonpregnant state due to use of glucose by fetus. Plasma hydroxybutyrate & acetoacetate levels may rise to 2 - 4 times the normal after a fast.

1032 During pregnancy, maternal insulin resistance is due to ?*Harrison's 17th Ed. 46*

- A. Placental production of steroids
- B. Placental production of a growth hormone variant
- C. Placental production of placental lactogen
- D. All of the above

Metabolic changes in pregnancy includes maternal insulin resistance caused by placental steroid production, growth hormone variant & placental lactogen.

1033 Pregnancy complicated by diabetes mellitus, aim should be to keep all blood glucose levels below ?*Harrison's 17th Ed. 46*

- A. 126 mg/dL
- B. 140 mg/dL
- C. 180 mg/dL
- D. 200 mg/dL

In pregnancy, fasting blood glucose should be maintained at <105 mg/dL with no values >140 mg/dL to reduce congenital anomalies like sacral agenesis, caudal dysplasia, renal agenesis & ventricular septal defect.

1034 After a 50-gram oral glucose challenge in a pregnant woman, what level of serum glucose measured at 60 minutes is considered normal ?*Harrison's 17th Ed. 46*

- A. <100 mg/dL
- B. <126 mg/dL
- C. <140 mg/dL
- D. <160 mg/dL

For diagnosis of gestational diabetes, after a 50 gram oral glucose challenge, serum glucose is measured at 60 minutes. Values <140 mg/dL are normal.

1035 After a 100-gram oral glucose challenge in a pregnant woman, what level of serum glucose measured at 60 minutes is considered normal ?*Harrison's 17th Ed. 46*

- A. <140 mg/dL
- B. <160 mg/dL
- C. <190 mg/dL
- D. <200 mg/dL

1036 After a 100-gram oral glucose challenge in a pregnant woman, what level of serum glucose measured at 120 minutes is considered normal ?*Harrison's 17th Ed. 46*

- A. <100 mg/dL
- B. <126 mg/dL
- C. <140 mg/dL
- D. <165 mg/dL

1037 After a 100-gram oral glucose challenge in a pregnant woman, what level of serum glucose measured at 180 minutes is considered normal ?*Harrison's 17th Ed. 46*

- A. <100 mg/dL
- B. <126 mg/dL
- C. <145 mg/dL
- D. <165 mg/dL

After a 100-gram oral glucose challenge in a pregnant woman, normally fasting, 1, 2 and 3 hour plasma glucose concentrations are <105, 190, 165, and 145 mg/dL, respectively.

1038 Insulin therapy in gestational diabetes should be started when 2-hour postprandial glucose concentrations is ?*Harrison's 16th Ed. 35*

- A. > 120 mg/dL
- B. > 140 mg/dL
- C. > 160 mg/dL
- D. > 180 mg/dL

1039 Which of the following is a common feature of pregnancy ?*Harrison's 16th Ed. 270*

- A. Respiratory acidosis
- B. Respiratory alkalosis
- C. Metabolic alkalosis
- D. Metabolic acidosis

1040 Circulating levels of which of the following remains unaltered by pregnancy ?*Harrison's 17th Ed. 47*

- A. Free T₄
- B. Free T₃
- C. Thyroid stimulating hormone (TSH)
- D. All of the above

1041 Circulating levels of which of the following is increased by pregnancy ?*Harrison's 17th Ed. 47*

- A. Total T₄
- B. Total T₃
- C. Thyroxine-binding globulin (TBG)
- D. All of the above

In pregnancy, estrogen-induced increase in thyroxine-binding globulin causes increase in circulating levels of total T₃ & total T₄. Normal range of circulating levels of free T₄, free T₃, & TSH remain unaltered by pregnancy.

1042 Treatment of choice of hyperthyroidism in pregnancy is ?*Harrison's 17th Ed. 47*

- A. Propylthiouracil
- B. Methimazole
- C. Saturated solution of potassium iodide
- D. Beta blockers

Methimazole crosses placenta more than propylthiouracil & is associated with fetal aplasia cutis. Beta blockers & saturated solution of potassium iodide may be necessary in emergency.

1043 Hyperthyroidism is most difficult to control in ?*Harrison's 17th Ed. 47*

- A. First trimester of pregnancy
- B. Second trimester of pregnancy
- C. Third trimester of pregnancy
- D. Any of the above

1044 Hyperthyroidism is easiest to control in ?*Harrison's 17th Ed. 47*

- A. First trimester of pregnancy
- B. Second trimester of pregnancy

- C. Third trimester of pregnancy
- D. Any of the above

Hyperthyroidism is most difficult to control in the first trimester of pregnancy and easiest to control in the third trimester.

1045 During pregnancy with hypothyroidism, the dose of thyroxine required to keep TSH in normal range is ?

Harrison's 17th Ed. 47

- A. Increased
- B. Decreased
- C. Same
- D. Any of the above

During pregnancy, the dose of thyroxine required to keep the TSH in the normal range rises. Increased thyroxine requirement occurs as early as 5th week of pregnancy, thyroxine dose is increased by 30% as soon as pregnancy is diagnosed & then adjusted by serial measurement of TSH.

1046 Thrombocytopenia during pregnancy may be due to ?

Harrison's 17th Ed. 47

- A. Benign gestational thrombocytopenia
- B. Immune thrombocytopenia
- C. Preeclampsia
- D. Any of the above

Thrombocytopenia occurs commonly during pregnancy (benign gestational thrombocytopenia). Differential diagnosis should include immune thrombocytopenia, preeclampsia, retention of dead fetus, sepsis, abruptio placenta & amniotic fluid embolism.

1047 Migraine during pregnancy may ?

Harrison's 17th Ed. 47

- A. Worsen
- B. Improve
- C. Remain same
- D. Any of the above

Headache appearing during pregnancy is usually migraine which may worsen, improve, or be unaffected by pregnancy.

1048 Chorea may be a manifestation of all except ?

Harrison's 16th Ed. 139

- A. Birth control pills
- B. Pregnancy
- C. Hypothyroidism
- D. Antiphospholipid syndrome

Acute or subacute chorea is due to toxins (excess levodopa, dopamine-agonist therapy), neuroleptics, birth control pills, pregnancy (chorea gravidarum), hyperthyroidism or antiphospholipid syndrome.

1049 Symptoms of "Restless legs syndrome" (RLS) can be exacerbated by ?

Harrison's 16th Ed. 158

- A. Sleep deprivation
- B. Caffeine
- C. Pregnancy
- D. All of the above

1050 "Meralgia paresthetica" is caused by entrapment of ?

Harrison's 17th Ed. 47

- A. Median nerve
- B. Lateral femoral cutaneous nerve

- C. Ulnar nerve
- D. Common peroneal nerve

Manifests as pain and numbness in the lateral aspect of thigh without weakness. It is due to entrapment of lateral femoral cutaneous nerve.

1051 Which of the following diseases show exacerbation during pregnancy ?

Harrison's 17th Ed. 47

- A. Crohn's disease
- B. Ulcerative colitis
- C. Gall bladder disease
- D. All of the above

Crohn's disease shows exacerbation in second and third trimesters, Ulcerative colitis shows exacerbation in first trimester and during early postpartum period. Gall bladder disease exacerbation is due to pregnancy-induced alteration in the metabolism of bile and fatty acids.

1052 Intrahepatic cholestasis of pregnancy happens during ?

Harrison's 17th Ed. 48

- A. First trimester
- B. Second trimester
- C. Third trimester
- D. Any of the above

Intrahepatic cholestasis of pregnancy is a 3rd trimester event manifesting as profound pruritus. It is associated with increased fetal mortality.

1053 Acute fatty liver of pregnancy is characterized by all except ?

Harrison's 17th Ed. 48

- A. Markedly increased levels of bilirubin
- B. Markedly increased levels of ammonia
- C. Hypoglycemia
- D. Hyperglycemia

Acute fatty liver of pregnancy is characterized by markedly increased levels of bilirubin & ammonia & hypoglycemia.

1054 Infants born to mothers who are carriers of HBsAg should also receive ?

Harrison's 17th Ed. 48

- A. Hepatitis B immune globulin
- B. Hepatitis B vaccine
- C. Hepatitis B Ig + Hepatitis B vaccine
- D. None of the above

Infants born to mothers who are carriers of hepatitis B surface antigen should receive hepatitis B immune globulin soon after birth (within first 72 hours).

1055 Screening of pregnant woman with nitrite/leukocyte esterase urine strips is done for ?

Harrison's 17th Ed. 48

- A. Urinary tract tuberculosis
- B. Asymptomatic bacteriuria
- C. Urinary tract fungal infection
- D. All of the above

Screening for asymptomatic bacteriuria with nitrite/leukocyte esterase strips is indicated for high-risk pregnant women (sickle cell trait or a history of UTI).

1056 Intrauterine amniotic infection is most often caused by ?

Harrison's 17th Ed. 48

- A. Group B streptococcus

- B. Staphylococcus

C. B. coli

D. Chlamydia

Intrauterine amniotic infection is mostly caused by Escherichia coli & group B streptococcus. Penicillin G & ampicillin are the drugs of choice. In penicillin-allergic patients, clindamycin is recommended.
- 1057 Severe CMV disease in newborn is characterized by all except ?

Harrison's 17th Ed. 48

A. Petechiae

B. Hepatosplenomegaly

C. Iron deficiency anemia

D. Jaundice

Hemolytic anemia may be present.
- 1058 Severe CMV disease in the newborn is characterized by all except ?

Harrison's 17th Ed. 48

A. Chorioretinitis

B. Macrocephaly

C. Intracranial calcifications

D. Hepatitis

Severe cytomegalovirus infection in newborn is characterized by petechiae, hepatosplenomegaly & jaundice. Chorioretinitis, microcephaly, intracranial calcifications, hepatitis, hemolytic anemia, and purpura may also develop.
- 1059 Risk of fetal anomalies in congenital rubella is highest in ?

Harrison's 17th Ed. 48

A. First trimester

B. Second trimester

C. Third trimester

D. Equally in all three trimesters

Rubella virus is a known teratogen. First-trimester rubella carries a high risk of fetal anomalies, risk decreases later in pregnancy.
- 1060 Most primary infections of toxoplasmosis in US come from ?

Harrison's 16th Ed. 37

A. Sex with multiple partners

B. Homosexuality

C. Eating undercooked meat

D. Use of tampons

1061 Triple-drug therapy for placental/fetal toxoplasmosis includes all except ?

Harrison's 16th Ed. 37

A. Spiramycin

B. Tetracycline

C. Pyrimethamine

D. Sulfonamide

1062 Which of the following does not increase the risk of mother-to-child transmission of HIV ?

Harrison's 17th Ed. 48

A. Cesarean section

B. Preterm delivery

C. Trauma to fetal skin

D. Maternal bleeding

Exposures which increase risk of mother-to-child transmission include vaginal delivery, preterm delivery, trauma to fetal skin, maternal bleeding, recent infection with high maternal viral load, low maternal CD4+ T cell count, prolonged labor, prolonged length of membrane rupture, and the presence of other genital tract infections (syphilis or herpes).

1063 Majority of cases of mother-to-child (vertical) transmission of HIV-1 occur during ?

Harrison's 17th Ed. 48

A. Antepartum period

B. Intrapartum period

C. Postpartum period

D. Breast feeding

Majority of mother-to-child (vertical) transmission of HIV-1 occur during intrapartum period. Mechanisms of vertical transmission is infection after rupture of membranes & direct contact of fetus with infected secretions or blood from maternal genital tract. Breast-feeding may transmit HIV to the newborn and is therefore contraindicated for HIV-infected mothers.

1064 Which of the following reduces the risk of vertical transmission of HIV infection ?

Harrison's 17th Ed. 49

A. Cesarean section

B. Zidovudine therapy before & during delivery

C. Zidovudine treatment to neonate at birth

D. All of the above

Zidovudine (ZDV) administered during pregnancy and labor and to the newborn reduces the risk of vertical transmission by 70%. Cesarean section is associated with additional risk reduction compared to vaginal delivery, especially in women with a viral load >1000 copies/mL. Regardless of the mode of delivery, intrapartum ZDV should be provided.

1065 Most common causes of maternal death in United States today is ?

Harrison's 17th Ed. 49

A. Hypertension

B. Pulmonary embolism

C. Ectopic pregnancy

D. Obstetric hemorrhage

Most common causes of maternal death in US today are, in decreasing order of frequency, pulmonary embolism, obstetric hemorrhage, hypertension, sepsis, cardiovascular conditions including peripartum cardiomyopathy & ectopic pregnancy.

1066 Infertility is defined as the inability to conceive after how many months of unprotected sexual intercourse ?

Harrison's 18th Ed. 3035

A. 3

B. 6

C. 9

D. 12

Infertility is defined as the inability to conceive after 12 months of unprotected sexual intercourse.

1067 Infertility can be attributed primarily to female factors in what percentage of infertile couples ?

Harrison's 18th Ed. 3035

A. 28 %

B. 42 %

C. 58 %

D. 76 %

Infertility can be attributed primarily to male factors in 25%, female factors in 58%, and is unexplained in ~17% of couples.

1068 Secondary sexual characteristics in girls include ?

Harrison's 18th Ed. 3033

- A. Thelarche
- B. Pubarche
- C. Adrenarche
- D. All of the above

1069 Among the secondary sexual characteristics in girls, which of the following appears first ?

Harrison's 18th Ed. 3033

- A. Development of breast buds (thelarche)
- B. Development of pubic hair (pubarche)
- C. Development of axillary hair (adrenarche)
- D. All of the above

At age 10 to 11, first secondary sexual characteristics appear in girls. They are development of the breast buds (thelarche), followed by development of pubic hair (pubarche) & later by development of axillary hair (adrenarche).

1070 Average time between the beginning of breast development and onset of menses i.e. menarche is ?

Harrison's 18th Ed. 3033

- A. 6 months
- B. 12 months
- C. 18 months
- D. 24 months

Average time between beginning of breast development & onset of menses (menarche) is 2 years.

1071 Conditions that can delay menarche include all except ?

Harrison's 16th Ed. 2198

- A. Active participation in sports
- B. Malnutrition
- C. Obesity
- D. Chronic debilitating disease

1072 Condition that leads to early menarche is ?

Harrison's 16th Ed. 2198

- A. Active participation in sports
- B. Malnutrition
- C. Obesity
- D. Chronic debilitating disease

Obese girls have earlier menarche than girls with normal body weight. Active participation in sports, malnutrition & chronic debilitating disease delay menarche.

1073 Which of the following determine age of menarche ?

Harrison's 16th Ed. 2198

- A. Total body weight
- B. Percent body fat
- C. Nutrition
- D. All of the above

A critical combination of total body weight & percent body fat is associated with development of hypothalamic insensitivity to feedback by steroids that leads to increased secretion of gonadotropins & to menarche.

1074 Evidence of ovulation is provided by which of the following ?

Harrison's 16th Ed. 279

- A. Urinary ovulation predictor kits
- B. Basal body temperature charts
- C. Mid-luteal phase progesterone level
- D. All of the above

1075 For confirmation of ovulation, mid-luteal phase progesterone level should be ?

Harrison's 16th Ed. 279

- A. > 0.5 ng/mL
- B. > 1 ng/mL
- C. > 2 ng/mL
- D. > 3 ng/mL

Evidence of ovulation is provided by urinary ovulation predictor kits (preovulatory gonadotropin surge), basal body temperature charts, or a mid-luteal phase progesterone rise which is usually > 3 ng/mL.

1076 Which of the following predicts adequate "ovarian oocyte reserve" ?

Harrison's 16th Ed. 279

- A. FSH level < 5 IU/mL on cycle day 1
- B. FSH level < 5 IU/mL on cycle day 3
- C. FSH level < 10 IU/mL on cycle day 1
- D. FSH level < 10 IU/mL on cycle day 3

Evaluation of ovarian reserve is done by measurement of FSH on day 3 of menstrual cycle or in response to clomiphene, an estrogen antagonist. An FSH level < 10 IU/mL on cycle day 3 predicts adequate ovarian oocyte reserve.

1077 Normal male fertility is associated with sperm count, motility and normal sperm morphology percentage of ?

Harrison's 16th Ed. 280

- A. > 48 million/mL, > 63%, > 6% respectively
- B. > 48 million/mL, > 63%, > 12% respectively
- C. > 48 million/mL, > 36%, > 6% respectively
- D. > 48 million/mL, > 36%, > 12% respectively

1078 Male subfertility is associated with sperm count, motility and normal sperm morphology percentage of ?

Harrison's 16th Ed. 280

- A. < 13 million/mL, < 32%, < 9% respectively
- B. < 18 million/mL, < 32%, < 9% respectively
- C. < 23 million/mL, < 32%, < 9% respectively
- D. < 33 million/mL, < 32%, < 9% respectively

Normal male fertility is associated with sperm counts of > 48 million/mL, with a motility of > 63%, with > 12% showing normal morphology. Subfertility is seen with sperm counts of < 13 million/mL, motility of < 32%, and < 9% normal morphology.

1079 Which of the following is true in males with "primary gonadal deficiency" ?

Harrison's 16th Ed. 280

- A. Low testosterone level
- B. Elevated levels of LH
- C. Elevated levels of FSH
- D. All of the above

Low testosterone level with raised levels of LH & FSH indicate primary gonadal deficiency.

1080 Which of the following is false in males with “secondary hypogonadism” ?

Harrison's 16th Ed. 280

- A. Low testosterone level
- B. Low LH level
- C. Low FSH level
- D. Low prolactin level

Decreased spermatogenesis due to hypothalamic or pituitary disease show low testosterone & decreased spermatogenesis with low LH & FSH levels.

1081 Congenital absence of the vas deferens can be diagnosed by ?

Harrison's 16th Ed. 280

- A. Deficiency of glucose in ejaculate
- B. Deficiency of fructose in ejaculate
- C. Deficiency of sucrose in ejaculate
- D. Deficiency of galactose in ejaculate

Congenital absence of vas deferens is diagnosed by deficiency of fructose in the ejaculate. It is often associated with an abnormality of cystic fibrosis transmembrane regulator (CFTR) gene.

1082 Inspissated secretions precluding normal sperm transport is seen in ?

Harrison's 16th Ed. 280

- A. Bowen syndrome
- B. Hess syndrome
- C. Young's syndrome
- D. Bloom syndrome

Young's syndrome, characterized by inspissated secretions, can preclude normal sperm transport.

1083 Which of the following about “Clomiphene citrate” is false ?

Harrison's 16th Ed. 280

- A. Nonsteroidal estrogen antagonist
- B. Increases FSH levels
- C. Increases LH levels
- D. None of the above

Clomiphene citrate is a nonsteroidal estrogen antagonist that increases FSH & LH levels by blocking estrogen negative feedback in hypothalamus.

1084 Which of the following drugs has no risk of ovarian hyperstimulation ?

Harrison's 16th Ed. 280

- A. Gonadotropins
- B. Pulsatile GnRH
- C. Clomiphene
- D. All of the above

Pulsatile GnRH restores ovulation in hypothalamic amenorrhea and carries virtually no risk of ovarian hyperstimulation.

1085 “ICSI” stands for ?

Harrison's 16th Ed. 281

- A. Intracavitary sperm injection
- B. Intracytoplasmic sperm injection
- C. Intracorporeal sperm injection
- D. None of the above

ICSI stands for intracytoplasmic sperm injection.

1086 Tubal ligation reduces the risk of ?

Harrison's 16th Ed. 281

- A. Ovarian cancer
- B. Endometrial cancer
- C. Cervical cancer
- D. Breast cancer

In addition to prevention of pregnancy, tubal ligation reduces the risk of ovarian cancer, possibly by limiting the upward migration of potential carcinogens.

1087 After vasectomy, development of azoospermia may be delayed for ?

Harrison's 16th Ed. 282

- A. 15 days to 3 months
- B. 1 to 4 months
- C. 2 to 6 months
- D. 6 to 9 months

After vasectomy, development of azoospermia may be delayed for 2 to 6 months.

1088 Copper IUDs inhibit pregnancy primarily through ?

Harrison's 16th Ed. 282

- A. Alteration in endometrial lining
- B. Spermicidal effect
- C. Inhibition of implantation
- D. All of the above

Intrauterine devices (IUDs) inhibit pregnancy primarily through a spermicidal effect caused by a sterile inflammatory reaction produced by the presence of a foreign body in the uterine cavity (copper IUDs) or by release of progestins (Progestasert).

1089 IUD should not be used in women at high risk for ?

Harrison's 16th Ed. 282

- A. Urinary tract infections
- B. Bacterial endocarditis
- C. Pneumonia
- D. All of the above

IUD should not be used in women at high risk for development of STDs or in women at high risk for bacterial endocarditis.

1090 Oral contraceptive pills act by ?

Harrison's 16th Ed. 282

- A. Suppressing ovulation
- B. Changing cervical mucus
- C. Altering endometrium
- D. All of the above

Oral contraceptive pills act by suppressing ovulation, changing cervical mucus & altering endometrium.

1091 Which of the following progestins is most androgenic ?

Harrison's 16th Ed. 282

- A. Norgestimate
- B. Norethindrone
- C. Levonorgestrel
- D. Desogestrel

1092 Which of the following progestins is least androgenic ?

Harrison's 16th Ed. 282

- A. Norgestimate

- B. Norethindrone
- C. Levonorgestrel
- D. Gestodene

Synthetic progestins like norethindrone, norgestimate, desogestrel, gestodene and drospirenone have a less androgenic profile. Levonorgestrel is most androgenic of the progestins & should be avoided in hyperandrogenic states.

1093 Oral contraceptive formulations include all except ?

Harrison's 16th Ed. 282

- A. Fixed-dose estrogen-progestin combination
- B. Phasic estrogen progestin combination
- C. Progestin only
- D. Estrogens only

Major oral contraceptives are fixed-dose estrogen-progestin combination, phasic estrogenprogestin combination & progestin only.

1094 Combination oral contraceptive is administered daily for ?

Harrison's 16th Ed. 282

- A. 1 week
- B. 2 weeks
- C. 3 weeks
- D. 4 weeks

1095 Which of the following oral contraceptive formulation is administered continuously ?

Harrison's 16th Ed. 282

- A. Fixed-dose estrogen-progestin combination
- B. Phasic estrogen progestin combination
- C. Progestin only
- D. All of the above

Combination formulations are given daily for 3 weeks followed by a week of no medication during which menstrual bleeding generally occurs. Progestin-only pills are administered continuously.

1096 Which of the following oral contraceptive formulation is appropriate for women with cardiovascular disease ?

Harrison's 16th Ed. 282

- A. Fixed-dose estrogen-progestin combination
- B. Phasic estrogen progestin combination
- C. Microdose Progestin only
- D. Any of the above

Microdose progestin-only minipill is appropriate for women with cardiovascular disease or for women who cannot tolerate synthetic estrogens.

1097 After discontinuation of Depo-Provera, fertility usually returns after ?

Harrison's 16th Ed. 282

- A. 2 to 6 months
- B. 6 to 12 months
- C. 12 to 18 months
- D. 18 to 24 months

Intramuscular Depo-Provera is effective for 3 months. Return of fertility after discontinuation may be delayed for up to 12 to 18 months.

1098 Increased incidence of gallbladder disease is seen after use of which of the following contraceptive formulation ?

Harrison's 16th Ed. 282

- A. Fixed-dose estrogen-progestin combination

- B. Phasic estrogen progestin combination
- C. Microdose Progestin
- D. Injectable progestin-based contraceptives

Major advantage of injectable progestin-based contraceptives is lack of increased arterial & venous thromboembolic events. But increased gallbladder disease & decreased bone density may occur.

1099 Contraception by injectable Norplant is effective for what duration ?

Harrison's 16th Ed. 282

- A. 1 year
- B. 3 years
- C. 5 years
- D. 7 years

Long-term progestin Norplant requires surgical insertion & is effective for up to 5 years after insertion.

1100 Unprotected intercourse without regard to time of month carries what incidence of pregnancy ?

Harrison's 16th Ed. 282

- A. 2 %
- B. 8 %
- C. 16 %
- D. 25 %

1101 Emergency contraceptives should be used within how many hours after unprotected intercourse ?

Harrison's 16th Ed. 282

- A. 12 hours
- B. 24 hours
- C. 36 hours
- D. 72 hours

Unprotected intercourse without regard to time of month carries 8% incidence of pregnancy which can be reduced to 2% by the use of emergency contraceptives within 72 hours of unprotected intercourse.

1102 Which of the following is used as emergency contraceptive ?

Harrison's 16th Ed. 282

- A. Ethinyl estradiol and Levonorgestrel
- B. Levonorgestrel
- C. Mifepristone
- D. All of the above

Ethinyl estradiol + levonorgestrel, levonorgestrel and mifepristone are approved for postcoital contraception.

1103 Which of the following is part of a reversible male contraceptive ?

Harrison's 16th Ed. 282

- A. Long-acting testosterone
- B. GnRH antagonist
- C. Progestin
- D. All of the above

Combination of a long-acting testosterone preparation with GnRH antagonist or a progestin (norgestral, desonorgestrel, norethisterone) is part of an effective male contraceptive or male pill.

1104 In which week of developing foetus, primitive ovary can be distinguished from the testis ?

Harrison's 16th Ed. 2198

- A. Fifth week

- B. Sixth week
- C. Seventh week
- D. Eighth week

Gonads exist in an undifferentiated state until the seventh week of fetal life, at which time the primitive ovary can be distinguished from the testis.

1105 Maximum number of germ cells are present in ovary at ?

Harrison's 16th Ed. 2198

- A. 5th to 6th month of gestation
- B. Birth
- C. Menarche
- D. Pregnancy

Ovary contains a finite number of germ cells, the number peaking at about 7 million oogonia by 5th to 6th month of gestation.

1106 How many germ cells are present in ovary at birth ?

Harrison's 17th Ed. 2325

- A. ~ 1 million
- B. ~ 2 million
- C. ~ 3 million
- D. ~ 4 million

At birth, oogonia are no longer present in the ovary, and only 1 - 2 million germ cells remain.

1107 How many germ cells are present in ovary at menarche ?

Harrison's 16th Ed. 2198

- A. ~ 200,000
- B. ~ 400,000
- C. ~ 600,000
- D. ~ 800,000

Germ cells decrease in number through atresia so that approximately 1 million remain at birth, 400,000 at menarche & only a few remain at menopause.

1108 Follicular phase of menstrual cycle is also called ?

Harrison's 16th Ed. 2199

- A. Proliferative phase
- B. Luteal phase
- C. Secretory phase
- D. None of the above

Proliferative or follicular phase of menstrual cycle is estrogen driven initial phase.

1109 Luteal phase of menstrual cycle is also called ?

Harrison's 16th Ed. 2199

- A. Proliferative phase
- B. Follicular phase
- C. Secretory phase
- D. None of the above

Secretory or luteal phase of menstrual cycle is progesterone driven later phase.

1110 Which of the following statements about FSH is false ?

Harrison's 16th Ed. 2200

- A. Inhibin selectively suppresses FSH
- B. Feedback of estrogen involves hypothalamus & pituitary
- C. FSH secretion is inhibited progressively as estrogen levels increase

- D. LH secretion is suppressed maximally by sustained high levels of estrogen

LH secretion is suppressed maximally by sustained low levels of estrogen and is enhanced by a rising level of estradiol denoting a positive feedback.

1111 Length of menstrual cycle is defined as ?

Harrison's 16th Ed. 2200

- A. From end of one menstrual bleeding episode to onset of next
- B. From end of one menstrual bleeding episode to end of next
- C. From onset of one menstrual bleeding episode to onset of next
- D. From onset of one menstrual bleeding episode to end of next

Length of the menstrual cycle is defined as the time from the onset of one menstrual bleeding episode to onset of the next.

1112 In an adult female, menstrual cycle averages ?

Harrison's 16th Ed. 2200

- A. 28 ± 2 days
- B. 28 ± 3 days
- C. 28 ± 4 days
- D. 28 ± 5 days

1113 In an adult female, mean duration of menstrual flow averages ?

Harrison's 16th Ed. 2200

- A. 4 ± 2 days
- B. 4 ± 3 days
- C. 4 ± 4 days
- D. 4 ± 5 days

In women of reproductive age, cycle averages 28 ± 3 days & mean duration of flow is 4 ± 2 days.

1114 Menstrual cycles at menarche and near the onset of menopause are ?

Harrison's 16th Ed. 2200

- A. Shorter
- B. Longer
- C. Normal duration
- D. Any of the above

Longer menstrual cycles (usually anovulatory) occur at menarche and near the onset of menopause.

1115 Preceding menopause, interval between menses becomes ?

Harrison's 16th Ed. 2200

- A. Shorter
- B. Longer
- C. Normal duration
- D. Any of the above

Preceding menopause, pattern of menstrual cycles is variable, but the interval between menses usually becomes shorter, as follicular recruitment is hastened by increases in FSH.

1116 Which of the following is true at the end of a menstrual cycle ?

Harrison's 16th Ed. 2200

- A. Plasma levels of estrogen fall
- B. Plasma levels of progesterone fall
- C. Circulating levels of FSH increase
- D. All of the above

1117 Plasma estradiol levels begin to rise about how many days before the "midcycle LH surge" ?

Harrison's 16th Ed. 2200

- A. 5 to 7 days
- B. 8 to 10 days
- C. 11 to 13 days
- D. 13 to 15 days

~ 8 to 10 days prior to midcycle LH surge, plasma estradiol levels begin to rise as the result of estradiol formation by the granulosa cells of the dominant follicle.

1118 Estradiol secretion reaches a peak at ?

Harrison's 16th Ed. 2200

- A. Just before ovulation
- B. At the time of ovulation
- C. Just after ovulation
- D. Any of the above

Just before ovulation, estradiol secretion reaches a peak and then falls.

1119 Ovulation from the dominant follicle occurs how many hours after the LH peak ?

Harrison's 16th Ed. 2200

- A. 10 to 12 hours
- B. 12 to 14 hours
- C. 16 to 23 hours
- D. 24 to 38 hours

Follicular rupture & ovulation occurs 16 to 23 hours after the LH peak.

1120 Ovulation from the dominant follicle occurs how many hours after the onset of the LH surge ?

Harrison's 16th Ed. 2200

- A. 10 to 12 hours
- B. 12 to 14 hours
- C. 16 to 23 hours
- D. 24 to 38 hours

Ovulation from the dominant follicle occurs 16 to 23 hours after the LH peak and 24 to 38 hours after the onset of the LH surge when the follicular wall ruptures in the area of the stigma.

1121 Plasma progesterone level begins to rise at what time ?

Harrison's 16th Ed. 2200

- A. Just prior to midcycle
- B. At midcycle
- C. After midcycle
- D. Any of the above

Plasma progesterone level begins to rise just prior to midcycle & facilitates the positive feedback action of estradiol on LH secretion.

1122 Which of the following is false about hormone status at the onset of luteal phase ?

Harrison's 16th Ed. 2200

- A. Plasma FSH decreases
- B. Plasma LH decreases
- C. Plasma progesterone increases
- D. None of the above

1123 Which of the following is false about hormone status near the end of the luteal phase?

Harrison's 16th Ed. 2200

- A. Plasma FSH begins to rise
- B. Plasma estrogen decreases
- C. Plasma progesterone decreases
- D. None of the above

1124 Following one menstrual cycle, development of the next follicle is usually in the ?

Harrison's 16th Ed. 2200

- A. Same ovary
- B. Contralateral ovary
- C. Both ovaries
- D. Any of the ovaries

Near the end of luteal phase, progesterone & estrogen levels fall & FSH levels begin to rise to initiate development of the next follicle (usually in the contralateral ovary) & the next menstrual cycle.

1125 Which of the following statements about "Inhibin" is false ?

Harrison's 16th Ed. 2200

- A. Inhibin A levels are low in the follicular phase
- B. Inhibin A levels reach a peak in the luteal phase
- C. Inhibin B levels are increased in the follicular phase
- D. Inhibin B levels reach a peak in the luteal phase

Inhibin A levels are low in the follicular phase but reach a peak in the luteal phase. Inhibin B levels are increased in the follicular phase & low in the luteal phase.

1126 Menstrual bleeding is due to ?

Harrison's 16th Ed. 2200

- A. Intense vasospasm occurs in the spiral arterioles
- B. Intense vasospasm occurs in the spiral venules
- C. Intense vasospasm occurs in endometrial capillaries
- D. All of the above

Intense vasospasm caused by locally synthesized prostaglandins occurs in spiral arterioles supplying blood to endometrium causing ischemic necrosis, endometrial desquamation and menstrual bleeding.

1127 Secretory phase of menstrual cycle is characterized by all except ?

Harrison's 16th Ed. 2200

- A. Tortuosity of the glands
- B. Curling of the spiral arterioles
- C. Glandular growth of the endometrium
- D. Glandular secretion

Glandular growth of the endometrium is mediated by estrogen during the proliferative phase.

1128 Which of the following about menopause is false ?

Harrison's 17th Ed. 2334

- A. Permanent cessation of menstruation
- B. Diagnosed retrospectively >12 months of amenorrhea
- C. Smoking accelerates menopausal transition by 2 years
- D. None of the above

Menopause is the permanent cessation of menstruation due to loss of ovarian follicular function.

1129 Menopause is the consequence of ?

Harrison's 17th Ed. 2334

- A. Resistance of ovaries to gonadotropins
- B. Exhaustion of ovarian follicles

- C. Resistance of pituitary to estradiol
- D. All of the above

Process of exhaustion of ovarian follicles begins in intrauterine life & terminates at menopause.

1130 Menopause is diagnosed retrospectively after how many months of amenorrhea ?

Harrison's 17th Ed. 2334

- A. 3
- B. 6
- C. 9
- D. 12

Menopause is diagnosed retrospectively >12 months of amenorrhea. Smoking accelerates the menopausal transition by 2 years.

1131 Preceding menopause, interval between menses is usually ?

Harrison's 17th Ed. 2334

- A. Shorter
- B. Longer
- C. Same
- D. Any of the above

1132 In perimenopause, intermenstrual intervals shorten significantly due to ?

Harrison's 17th Ed. 2334

- A. Acceleration in follicular phase
- B. Acceleration in luteal phase
- C. Acceleration in follicular & luteal phase
- D. None of the above

In perimenopause, intermenstrual intervals shorten significantly (typically by 3 days) due to an accelerated follicular phase.

1133 "Perimenopause" time period precedes final cessation of menses by a mean of how many months ?

Harrison's 17th Ed. 2334

- A. 12
- B. 24
- C. 36
- D. 48

Onset of perimenopause precedes the final menses by 2 - 8 years, with mean duration of 4 years.

1134 "Perimenopause" time period extends up till what time after final menses ?

Harrison's 17th Ed. 2334

- A. 3
- B. 6
- C. 9
- D. 12

Perimenopause refers to the time period preceding menopause, when fertility wanes and menstrual cycle irregularity increases, until the first year after cessation of menses.

1135 Perimenopause is characterized by which of the following ?

Harrison's 17th Ed. 2334

- A. Hypoestrogenic, hypoprogesteragenic environment
- B. Hyperestrogenic, hyperprogesteragenic environment
- C. Hyperestrogenic, hypoprogesteragenic environment

- D. Hypoestrogenic, hyperprogesteragenic environment

In perimenopause, anovulatory cycles produce a hyperestrogenic, hypoprogesteragenic environment that leads to an increased incidence of endometrial hyperplasia or carcinoma, uterine polyps, and leiomyoma observed among women of perimenopausal age.

1136 Predominant estrogen formed in menopausal women is ?

Harrison's 17th Ed. 2334

- A. Estradiol
- B. Estrone
- C. Estriol
- D. None of the above

Estradiol is secreted by ovaries and is the most potent estrogen. Most estrone is formed by extraglandular conversion of androstenedione in peripheral tissues, although some estrone is also produced by ovary. Estriol (16-hydroxyestradiol) is the main estrogen in urine and arises from 16-hydroxylation of estrone and estradiol.

1137 Which of the following statements about hormone levels is false as regards menopause ?

Harrison's 17th Ed. 2334

- A. Estradiol levels fall more than estrone levels
- B. FSH levels increase more than LH levels
- C. Reduced inhibin secretion
- D. None of the above

In menopause, estradiol levels fall markedly, whereas estrone levels are relatively preserved, reflecting peripheral aromatization of adrenal & ovarian androgens. FSH levels increase more than LH because of the loss of inhibin, as well as estrogen feedback.

1138 Which of the following FSH levels on day 3 of menstrual cycle indicate a good likelihood of achieving pregnancy ?

Harrison's 17th Ed. 2334

- A. < 20 mIU/mL
- B. 20 to < 30 mIU/mL
- C. 30 to < 40 mIU/mL
- D. >= 40 mIU/mL

FSH measurement aid in assessing fertility. Levels of <20 mIU/mL, 20 to <30 mIU/mL, and >=30 mIU/mL measured on day 3 of the cycle indicate a good, fair, and poor likelihood of achieving pregnancy, respectively.

1139 Which of the following treatments is useful in perimenopausal women ?

Harrison's 17th Ed. 2334

- A. Low-dose combined oral contraceptives
- B. Progestin-only formulations
- C. Nonsteroidal anti-inflammatory agents
- D. All of the above

Perimenopausal women with irregular or heavy menses or hormonally related symptoms benefit with low-dose combined oral contraceptives. Static doses of estrogen & progestin eliminate vasomotor symptoms & restore regular cyclicity. Progestin-only formulations or medroxyprogesterone injections are an alternative for perimenopausal menorrhagia in women who smoke or have cardiovascular risk factors. They reduce volume of menstrual flow. Nonhormonal strategies include NSAIDs or endometrial ablation.

1140 Premature ovarian failure or premature menopause applies to women who cease menstruating before age of ?

Harrison's 16th Ed. 2204

- A. 30
- B. 35
- C. 40
- D. 45

Term premature ovarian failure or premature menopause applies to women who cease menstruating before the age of 40 years.

1141 Which hormone is secreted in a pulsatile manner ?

Harrison's 16th Ed. 2201

- A. FSH
- B. LH
- C. Prolactin
- D. All of the above

Following hormones are secreted in a pulsatile manner - FSH, LH, gonadotropin-releasing hormone (GnRH), ACTH, TSH, GH and prolactin.

1142 Plasma gonadotropin measurements are of value in ?

Harrison's 16th Ed. 2201

- A. Evaluating women with suspected ovarian failure
- B. In diagnosis of polycystic ovarian syndrome (PCOS)
- C. In diagnosis of hypogonadotropic hypogonadism
- D. All of the above

1143 What value of FSH level is diagnostic of ovarian failure ?

Harrison's 16th Ed. 2201

- A. > 10 IU/L
- B. > 20 IU/L
- C. > 30 IU/L
- D. > 40 IU/L

1144 What value of LH suggests hypogonadotropic hypogonadism ?

Harrison's 16th Ed. 2201

- A. < 0.8 IU/L
- B. < 1.8 IU/L
- C. < 2.8 IU/L
- D. < 3.8 IU/L

FSH levels that are persistently > 40 IU/L are diagnostic of ovarian failure, and an LH value < 0.8 IU/L suggests hypogonadotropic hypogonadism.

1145 Which of the following is not useful in controlling vasomotor and genitourinary symptoms of menopause ?

Harrison's 16th Ed. 2210

- A. Estrogen therapy
- B. Clonidine
- C. Vitamin E
- D. Vitamin D

Estrogens, venlafaxine, clonidine, vitamin E are effective for controlling vasomotor and genitourinary symptoms in menopause.

1146 Which of the following reduces the risk of osteoporosis-related fractures ?

Harrison's 16th Ed. 2211

- A. Estrogen
- B. Calcium
- C. Vitamin D
- D. All of the above

1147 Dose of vitamin D given to reduce the risk of osteoporosis-related fractures is ?

Harrison's 16th Ed. 2211

- A. 100 to 300 IU/day
- B. 200 to 500 IU/day
- C. 400 to 800 IU/day

- D. 800 to 1500 IU/day

1148 Dose of oral calcium given to reduce the risk of osteoporosis-related fractures is ?

Harrison's 16th Ed. 2211

- A. 100 to 150 mg/day
- B. 300 to 500 mg/day
- C. 500 to 750 mg/day
- D. 1000 to 1500 mg/day

Increased physical activity, adequate calcium (1000 to 1500 mg/day) & vitamin D (400 to 800 IU/day) intakes reduces the risk of osteoporosis-related fractures.

1149 Which of the following is a selective estrogen receptor modulator ?

Harrison's 16th Ed. 2211

- A. Alendronate
- B. Residronate
- C. Raloxifene
- D. All of the above

Raloxifene is a selective estrogen receptor modulator (SERM).

1150 Postmenopausal Estrogen/Progestin Interventions trial found ?

Harrison's 16th Ed. 2212

- A. Increased risk of breast cancer
- B. Increased risk of endometrial cancer
- C. Increased risk of fracture
- D. All of the above

Postmenopausal Estrogen/Progestin Interventions (PEPI) trial found 24% of women assigned to unopposed estrogen for 3 years developed atypical endometrial hyperplasia, a premalignant lesion, compared to only 1% of women assigned to placebo. Use of a progestin eliminates these risks.

1151 In the Heart and Estrogen/progestin Replacement Study (HERS), risk of which of the following cancers was increased ?

Harrison's 16th Ed. 2212

- A. Breast cancer
- B. Endometrial cancer
- C. Colorectal cancer
- D. Urinary bladder cancer

In the Heart & Estrogen/progestin Replacement Study (HERS), 4 years of combination therapy was associated with a 27% increase in breast cancer risk.

1152 Exogenous estrogen administration in postmenopausal women produces all except ?

Harrison's 16th Ed. 2212

- A. Lowers LDL cholesterol
- B. Raises HDL cholesterol
- C. Lowers lipoprotein(a)
- D. Lowers triglycerides

Exogenous estrogen lowers plasma LDL cholesterol & Lp(a), raises HDL cholesterol levels and triglyceride levels.

1153 Which of the following is a "primary" prevention trial for assessing efficacy of hormone therapy in postmenopausal women ?

Harrison's 16th Ed. 2212

- A. Heart and Estrogen/progestin Replacement Study (HERS)
- B. Women's Health Initiative trial (WHI)
- C. Estrogen Replacement and Atherosclerosis (ERA) trial

D. Estrogen in the Prevention of Reinfarction Trial (ESPRIT)

In WHI, women assigned to receive combination hormones for an average of 5.6 years were 24% more likely to develop breast cancer than women assigned to placebo, but 7.1 years of estrogen-only therapy did not increase risk. Indeed, the WHI showed a trend toward a reduction in breast cancer risk with estrogen alone, although it is unclear whether this finding would pertain to formulations of estrogen other than conjugated equine estrogens or to treatment durations longer than 7 years.

1154 Estrogen-progestin therapy reduces risk of ?

Harrison's 16th Ed. 2212

- A. Colorectal cancer
- B. Breast cancer
- C. Gallbladder disease
- D. Coronary heart disease

In WHI, estrogen-progestin was associated with a significant 44% reduction in colorectal cancer over a 5.6-year period, although no benefit was seen with 7 years of estrogen-only therapy.

1155 In hot flush, a characteristic manifestation of menopause, sudden feeling of heat in felt over ?

Lancet 2005; 366: 409-21

- A. Face
- B. Neck
- C. Chest
- D. All of the above

1156 The average hot flush lasts about ?

Lancet 2005; 366: 409-21

- A. 1 minutes
- B. 2 minutes
- C. 3 minutes
- D. 4 minutes

1157 Oral oestrogen preparation used in HRT include ?

Lancet 2005; 366: 409-21

- A. Oestrone sulphate
- B. Oestriol
- C. Estradiol valerate
- D. All of the above

1158 Vaginal oestrogen does not improve which of the following ?

Lancet 2005; 366: 409-21

- A. Vaginal dryness
- B. Vaginal atrophy
- C. Urinary incontinence
- D. All of the above

1159 Tibolone has which of the following actions ?

Lancet 2005; 366: 409-21

- A. Oestrogenic
- B. Progestagenic
- C. Androgenic
- D. All of the above

1160 Phyto-oestrogens have oestrogen-like effects because of preferential binding to which oestrogen receptor ?

Lancet 2005; 366: 409-21

- A. α
- B. β

C. γ

D. δ

1161 Human chorionic gonadotropin (hCG) is secreted by ?

Harrison's 16th Ed. 2202

- A. Trophoblastic cells of the placenta
- B. Uterine myocardium
- C. Cervical mucus
- D. All of the above

1162 By plasma or urine hCG assays, pregnancy can be detected how many days after ovulation ?

Harrison's 16th Ed. 2202

- A. 1 to 3 days
- B. 3 to 5 days
- C. 5 to 7 days
- D. 8 to 10 days

hCG is secreted by trophoblastic cells of placenta into maternal plasma & excreted in urine. Plasma or urine assays of hCG CAN detect pregnancies 8 to 10 days after ovulation, before the first missed menstrual period.

1163 Which of the following is not a feature of cervical mucus that indicates adequate estrogen production ?

Harrison's 16th Ed. 2201

- A. Thick
- B. Copious
- C. Exhibiting arborization or ferning
- D. Clear

1164 Vaginal cytology findings that confirm the presence of adequate estrogen levels include all except ?

Harrison's 16th Ed. 2201

- A. Mature vaginal epithelial cells
- B. Abundant cornified squamous epithelial cells
- C. Predominantly intermediate cells
- D. Pyknotic nuclei

Presence of viscous cervical mucus that does not stretch or fern and of predominantly intermediate cells on vaginal cytology or demonstration of a secretory epithelium in an endometrial biopsy during the luteal phase is typical of progesterone secretion.

1165 What plasma progesterone level suggests successful ovulation and adequate corpus luteum function ?

Harrison's 16th Ed. 2202

- A. > 0.8 ng/mL
- B. > 1.6 ng/mL
- C. > 2.3 ng/mL
- D. > 3.0 ng/mL

Plasma progesterone level > 10 μ mol/L (> 3 ng/mL) suggests successful ovulation and adequate corpus luteum function.

1166 Under normal conditions, the ovary secretes which of the following androgen ?

Harrison's 16th Ed. 2202

- A. Androstenedione
- B. Testosterone
- C. Dehydroepiandrosterone
- D. All of the above

Under normal conditions, ovary secretes androstenedione, testosterone & dehydroepiandrosterone.

1167 Puberty is considered precocious if breast budding begins before the age of ?

Harrison's 16th Ed. 2202

- A. 8 years
- B. 9 years
- C. 10 years
- D. 11 years

1168 Puberty is considered precocious if menarche occurs before the age of ?

Harrison's 16th Ed. 2202

- A. 8 years
- B. 9 years
- C. 10 years
- D. 11 years

Puberty is precocious if breast budding begins before 8 years of or if menarche occurs before age 9.

1169 Heterosexual precocity is defined as ?

Harrison's 16th Ed. 2202

- A. Virilization in girls
- B. Feminization in boys
- C. Both of the above
- D. None of the above

1170 Which of the following is a type of "isosexual precocious puberty in girls" ?

Harrison's 16th Ed. 2202

- A. True precocious puberty
- B. Precocious pseudopuberty
- C. Incomplete isosexual precocity
- D. All of the above

Feminization in girls or virilization in boys are termed isosexual precocity. Heterosexual precocity occurs when sexual characteristics are not according to genetic sex i.e. virilization in girls or feminization in boys.

1171 Which of the following is false about true precocious puberty ?

Harrison's 16th Ed. 2202

- A. Gonadotropin-dependent
- B. Ovulatory menstrual cycles
- C. Early normal pubertal development
- D. None of the above

Gonadotropin-dependent true precocious puberty is characterized by an early but otherwise normal sequence of pubertal development, including increased secretion of gonadotropins & ovulatory menstrual cycles.

1172 Which of the following is of use in treatment of true precocious puberty ?

Harrison's 16th Ed. 2202

- A. GnRH analogues
- B. Gonadotropins
- C. Estrogen
- D. Progesterone

GnRH analogues suppress gonadotropins & inhibit estrogen synthesis thus blocking precocious puberty.

1173 Which of the following can cause true precocious puberty ?

Harrison's 16th Ed. 2202

- A. Encephalitis

- B. Head injury
- C. Neurofibromatosis
- D. All of the above

Constitutional or idiopathic precocious puberty accounts for 90% cases of true precocious puberty, 10% causes are due to organic brain diseases like brain tumors (hypothalamic gliomas, astrocytomas, ependymomas, germinomas & hamartomas), encephalitis, meningitis, hydrocephalus, head injury, tuberous sclerosis & neurofibromatosis.

1174 Most common form of congenital adrenal hyperplasia (CAH) is due to impairment of ?

Harrison's 16th Ed. 2145

- A. CYP21A2 (21-Hydroxylase)
- B. 17α-hydroxylase (CYP17)
- C. 11β-hydroxylase (CYP11B1)
- D. 3β-HSD2

Most common form of CAH (95%) is a result of impairment of CYP21A2.

1175 Which of the following is false about precocious pseudopuberty ?

Harrison's 16th Ed. 2202

- A. Gonadotropin-independent
- B. Enhanced estrogen formation
- C. Anovulatory cycles
- D. Regular cyclic menses

Gonadotropin-independent precocious pseudopuberty occurs when girls undergo feminization as a consequence of enhanced estrogen formation but do not ovulate or develop cyclic menses.

1176 Most frequent cause of precocious pseudopuberty is ?

Harrison's 16th Ed. 2202

- A. Dysgerminomas
- B. Ovarian teratomas
- C. Granulosa-theca cell tumors
- D. Cystadenomas

Ovarian cysts or tumors that secrete estrogen (granulosa-theca cell tumors) are the most frequent cause of precocious pseudopuberty.

1177 Precocious pseudopuberty can be caused by ?

Harrison's 16th Ed. 2202 Table 326-1

- A. McCune-Albright syndrome
- B. Primary Hypothyroidism
- C. Russell-Silver syndrome
- D. All of the above

Precocious pseudopuberty can be caused by ovarian tumors, adrenal tumors, McCune-Albright syndrome, hypothyroidism, Russell-Silver syndrome, and estrogen-containing medications.

1178 Hormone responsible for development of precocious pseudopuberty in primary hypothyroidism is ?

Harrison's 16th Ed. 2202

- A. FSH
- B. LH
- C. GnRH
- D. All of the above

Primary hypothyroidism is sometimes associated with increased secretion of FSH, inducing ovarian estrogen secretion. High levels of TSH caused by hypothyroidism may also stimulate FSH receptor.

1179 Which of the following can be a feature of incomplete isosexual precocity ?

Harrison's 16th Ed. 2202

- A. Premature thelarche
- B. Premature adrenarche
- C. Premature pubarche
- D. Any of the above

In incomplete isosexual precocity, premature development of a single pubertal event occurs.

1180 Which of the following is not a feature of incomplete isosexual precocity ?

Harrison's 16th Ed. 2202

- A. Premature thelarche
- B. Premature adrenarche
- C. Premature pubarche
- D. Clitoromegaly

Clitoromegaly is a feature of syndromes of virilization.

1181 Which of the following is recommended treatment of incomplete isosexual precocity ?

Harrison's 16th Ed. 2203

- A. Treatment with glucocorticoids
- B. Treatment with estrogens
- C. Treatment with ACTH
- D. No treatment

Usually, incomplete isosexual precocity is self-limited & resolves spontaneously. It requires no treatment & patients enter puberty around the average time.

1182 Virilization in a prepubertal female can be due to ?

Harrison's 16th Ed. 2203

- A. Congenital adrenal hyperplasia
- B. Androgen secretion by ovarian tumor
- C. Androgen secretion by adrenal tumor
- D. Any of the above

Virilization in a prepubertal female is usually due to congenital adrenal hyperplasia or to androgen secretion by an ovarian or adrenal tumor.

1183 Abnormal uterine bleeding refers to a bleeding pattern that differs in which of the following from a normal menstrual cycle ?

Harrison's 16th Ed. 2203

- A. Frequency
- B. Duration
- C. Amount
- D. Any of the above

Abnormal uterine bleeding is defined as any bleeding pattern that differs in frequency, duration or amount from the pattern observed during a normal menstrual cycle.

1184 Average blood loss during a menstrual cycle is ?

Harrison's 16th Ed. 2203

- A. 35 to 80 mL
- B. 80 to 135 mL
- C. 150 to 185 mL
- D. 200 to 230 mL

Average blood loss during a normal menstrual cycle is 35 to 80 mL.

1185 Normal menstrual bleeding with ovulatory cycles is characterized by all except ?

Harrison's 16th Ed. 2203

- A. Spontaneous
- B. Regular, cyclic
- C. Predictable
- D. Painless

Normal menstrual bleeding with ovulatory cycles is spontaneous, regular, cyclic, & predictable. It is frequently associated with discomfort (dysmenorrhea).

1186 Which of the following is false about hypomenorrhea ?

Harrison's 16th Ed. 2203

- A. Cyclic
- B. Unpredictable menstruation
- C. Spotting or light bleeding
- D. None of the above

Regular, cyclic, predictable menstruation characterized by spotting or light bleeding is termed hypomenorrhea and is due to obstruction of the outflow tract as from intrauterine synechiae or scarring of the cervix.

1187 Polymenorrhea is defined when regular menstruation occurs by how many days apart ?

Harrison's 16th Ed. 2203

- A. 21
- B. 23
- C. 25
- D. 27

Polymenorrhea refers to occurrence of regular menstruation more frequently than 21 days.

1188 Which of the following about dysfunctional uterine bleeding is false ?

Harrison's 16th Ed. 2203

- A. Unpredictable in amount
- B. Unpredictable in onset
- C. Unpredictable in duration
- D. Painful

1189 Which of the following is the cause of dysfunctional uterine bleeding ?

Harrison's 16th Ed. 2203

- A. Abnormalities of the uterus
- B. Interruption of normal sequence of follicular & luteal phases
- C. Permanent disruption of synchronous hypothalamic-pituitary-ovarian patterns
- D. All of the above

Dysfunctional uterine bleeding occurs in women who have a transient disruption of synchronous hypothalamic-pituitary-ovarian patterns required for ovulatory cycles.

1190 Most common type of primary dysfunctional uterine bleeding is due to ?

Harrison's 16th Ed. 2203

- A. Estrogen withdrawal bleeding
- B. Estrogen breakthrough bleeding
- C. Progesterone breakthrough bleeding
- D. None of the above

Most common type of DUB is estrogen breakthrough bleeding

1191 Primary amenorrhea is failure of menarche by age of ?

Harrison's 16th Ed. 2203

- A. 13

- B. 14
- C. 15
- D. 16

1192 Secondary amenorrhea is failure of menses for ?

Harrison's 16th Ed. 2203

- A. 3 months
- B. 6 months
- C. 9 months
- D. 12 months

Amenorrhea is failure of menarche by age 15, irrespective of presence or absence of secondary sexual characteristics, or absence of menstruation for 6 months in a woman with previous periodic menses.

1193 Karyotype in Mayer-Rokitansky-Kuster-Hauser syndrome is ?

Harrison's 16th Ed. 2204

- A. 45,XX
- B. 46,XX
- C. 47,XX
- D. 48,XX

Karyotype in women with Mayer-Rokitansky-Kuster-Hauser syndrome is 46,XX. Müllerian agenesis or Mayer-Rokitansky-Kuster-Hauser syndrome is associated with mutations in WNT4 gene.

1194 Which of the following is false about Mayer-Rokitansky-Kuster-Hauser syndrome ?

Harrison's 16th Ed. 2204

- A. Phenotypically normal females
- B. 46,XX karyotype
- C. Developed secondary sex characteristics
- D. Abnormal ovarian function

Mayer-Rokitansky-Kuster-Hauser syndrome (46,XX) subjects are women with müllerian agenesis i.e. absence or hypoplasia of the vagina. Female secondary sex characteristics with normal ovarian function, including cyclic ovulation are present.

1195 The tissue affected in Asherman's syndrome is ?

Harrison's 16th Ed. 2204

- A. Ovary
- B. Endometrium
- C. Cervix uteri
- D. Vagina

Destruction of endometrium due to vigorous curettage is called Asherman's syndrome.

1196 Which of the following is not a feature of 17 α -hydroxylase deficiency ?

Harrison's 16th Ed. 2204

- A. Autosomal dominant
- B. Primary amenorrhea
- C. Sexual infantilism
- D. Hypertension

17 α -Hydroxylase deficiency is an autosomal recessive disorder characterized by primary amenorrhea, sexual infantilism, and hypertension.

1197 Features of Kearns-Sayre syndrome include all except ?

Harrison's 16th Ed. 2237

- A. Hypoparathyroidism
- B. Primary hypogonadism
- C. Type 2 diabetes mellitus

D. Panhypopituitarism

Kearns-Sayre syndrome consists of hypoparathyroidism, primary hypogonadism, type 1 diabetes mellitus & panhypopituitarism.

1198 DiGeorge syndrome consists of which of the following ?

Harrison's 16th Ed. 2237

- A. Hypoparathyroidism
- B. Primary hypogonadism
- C. Type 1 diabetes mellitus
- D. Panhypopituitarism

DiGeorge syndrome is hypoparathyroidism due to glandular agenesis & mucocutaneous candidiasis.

1199 Wolfram's syndrome consists of which of the following ?

Harrison's 16th Ed. 2237

- A. Hyperthyroidism
- B. Panhypopituitarism
- C. Congenital diabetes insipidus
- D. Vitiligo

Wolfram's syndrome consists of congenital diabetes insipidus & diabetes mellitus.

1200 IPEX syndrome consists of which of the following ?

Harrison's 16th Ed. 2237

- A. Polyendocrinopathy
- B. Enteropathy
- C. Immunodysregulation
- D. All of the above

IPEX syndrome consists of immunodysregulation, polyendocrinopathy, enteropathy and is X-linked.

1201 Congenital rubella syndrome consists of ?

Harrison's 16th Ed. 2237

- A. Vitiligo
- B. Blindness
- C. Hypothyroidism
- D. Panhypopituitarism

Congenital rubella syndrome consists of type 1 diabetes mellitus & hypothyroidism.

1202 In the original observations of Stein and Leventhal in 1935, which of the following was not noted ?

N Engl J Med 2005;352:1223-36

- A. Amenorrhea
- B. Galactorrhoea
- C. Hirsutism
- D. Obesity

Published in 1935 in Am J Obstet Gynecol, observations in seven women with amenorrhea, hirsutism, obesity, and a characteristic polycystic appearance to their ovaries was mentioned.

1203 In woman with polycystic ovary syndrome, which of the following systems is affected ?

N Engl J Med 2005;352:1223-36

- A. Reproductive system
- B. Metabolic health
- C. Cardiovascular health
- D. All of the above

"Syndrome XX" is the term proposed for PCOD since it involves the metabolic milieu of the body through its effects on insulin resistance & plasma lipids leading to increased possibility of cardiovascular disease.

1204 Which of the following is not a feature of PCOS ?

N Engl J Med 2005;352:1223-36

- A. Oligoovulation or anovulation
- B. Hyperandrogenemia
- C. Hyperandrogenism
- D. Reduced level of luteinizing hormone

Characteristically, LH levels are increased in PCOD due to increased pulse frequency of GnRH and stimulation by excess extraglandular estrogen.

1205 Oligomenorrhea refers to ?

N Engl J Med 2005;352:1223-36

- A. Fewer than four menses per year
- B. Fewer than six menses per year
- C. Fewer than nine menses per year
- D. Fewer than ten menses per year

1206 For the initiation and perpetuation of chronic anovulation in PCOD, which of the following play a role ?

Harrison's 16th Ed. 2205

- A. Obesity
- B. Elevated adrenal androgens
- C. Increased formation of extraglandular estrogen
- D. All of the above

Obesity along with elevated adrenal androgens lead to increased formation of extraglandular estrogen which stimulates LH secretion and depresses FSH secretion by pituitary.

1207 Which of the following is not a feature of ovary in PCOD ?

Harrison's 16th Ed. 2204-5

- A. Sclerotic ovary
- B. Multiple follicular cysts
- C. Hyperplastic theca and stroma
- D. Presence of corpora albicans

Corpora albicans is the degenerating corpus luteum which is not formed in PCOD due to anovulation

1208 Anovulatory cycles in PCOD may cause ?

N Engl J Med 2005;352:1223-36

- A. Oligomenorrhea or amenorrhea
- B. Dysfunctional uterine bleeding
- C. Decreased fertility
- D. All of the above

Due to anovulation, copus luteum is not formed thus causing estrogen - progesterone imbalance.

1209 Cutaneous manifestations of hyperandrogenemia in polycystic ovary syndrome include all except ?

N Engl J Med 2005;352:1223-36

- A. Hirsutism
- B. Acne
- C. Acanthosis nigricans
- D. Androgenic alopecia

Acanthosis nigricans is the manifestation of hyperinsulinemia.

1210 Symptoms of polycystic ovary syndrome usually begin around ?

N Engl J Med 2005;352:1223-36

- A. Menarche
- B. First sexual contact

- C. First child birth
- D. Following oral contraceptive pill intake

PCOD symptoms begin around menarche which comes at the expected time. Oligomenorrhoea may occur after variable time thereafter.

1211 In most women with PCOS, menarche occurs ?

Harrison's 16th Ed. 2205

- A. Early
- B. At the expected time
- C. Late
- D. Any of the above

1212 Enhanced androgen production in PCOS is due to ?

N Engl J Med 2005;352:1223-36

- A. Increased frequency of LH pulses
- B. Synergistic action of insulin with LH
- C. Reduced hepatic synthesis of sex hormone - binding globulin (SHBG)
- D. All of the above

SHBG is synthesized by liver under the influence of androgens & insulin. Due to decreased levels of SHBG, excess of free, unbound testosterone is available in plasma leading to hyperandrogenemia & hyperandrogenism.

1213 Which of the following is false in PCOS ?

N Engl J Med 2005;352:1223-36

- A. Increased pulse frequency of hypothalamic GnRH
- B. Increased LH pulse frequency
- C. Increased FSH pulse frequency
- D. Hyperinsulinemia

FSH levels are characteristically reduced in plasma of PCOS patients due to negative feedback of estrogens on pituitary.

1214 In PCOS, LH to FSH ratio in plasma is characteristically greater than ?

Harrison's 16th Ed. 2205

- A. 0.75
- B. 1.25
- C. 1.75
- D. 2.00

1215 Chronic anovulation with estrogen present is found in all except ?

Harrison's 16th Ed. 2205

- A. Brenner tumors
- B. Isolated hypogonadotropic hypogonadism
- C. Hypothyroidism
- D. Krukenberg tumors

Isolated hypogonadotropic hypogonadism is a condition of chronic anovulation with estrogen absent.

1216 Chronic anovulation with estrogen present is found in all except ?

Harrison's 16th Ed. 2205

- A. Kallmann syndrome
- B. Adult-onset adrenal hyperplasia due to partial 21-hydroxylase deficiency

- C. Mucous cystadenomas
- D. Cystic teratomas

Kallmann syndrome is Isolated hypogonadotropic hypogonadism associated with defects of smell due to a single gene defect in the X-linked KAL gene.

1217 If pregnancy is desired by a woman suffering from PCOS, which of the following drugs is useful ?

Harrison's 16th Ed. 2205

- A. Metformin
- B. Thiazolidinediones
- C. Clomiphene
- D. All of the above

Insulin-sensitizing drugs improve fertility in women with PCOS. Clomiphene promotes ovulation.

1218 If pregnancy is desired by a woman suffering from PCOS, ovulation can be induced with which of the following drugs ?

Harrison's 16th Ed. 2205

- A. Human menopausal gonadotropin (hMG)
- B. Purified FSH (Urofollitropin)
- C. Gonadorelin
- D. All of the above

All the three drugs induce ovulation.

1219 If a woman having PCOS is not hirsute and does not desire pregnancy, treatment of choice is ?

Harrison's 16th Ed. 2205

- A. Medroxyprogesterone acetate
- B. Combined estrogen-progestogen therapy
- C. Cyproterone acetate
- D. Drospirenone

Medroxyprogesterone acetate treatment prevents development of endometrial hyperplasia and carcinoma by bringing about withdrawal menses.

1220 If a woman having PCOS is hirsute and does not desire pregnancy, treatment of choice is ?

Harrison's 16th Ed. 2205

- A. Medroxyprogesterone acetate
- B. Combined estrogen-progestogen therapy
- C. Clomiphene
- D. Human menopausal gonadotropin (hMG)

Estrogen is anti-androgenic.

1221 FSH secretion in PCOS can be enhanced by ?

Harrison's 16th Ed. 2205

- A. Clomiphene
- B. Human menopausal gonadotropin (hMG)
- C. GnRH (gonadorelin)
- D. All of the above

Clomiphene citrate is antiestrogenic and induces rise in FSH and LH.

1222 Which of the following drugs has antiandrogen effects ?

N Engl J Med 2005;352:1223-36

- A. Cyproterone acetate
- B. Estrogen
- C. Drospirenone

- D. All of the above

Cyproterone acetate is antiandrogenic by inhibiting androgens from binding to androgen receptors. Estrogen suppresses LH and thus ovarian androgen production. Estrogen also enhances hepatic production of SHBG thereby reducing free and unbound plasma testosterone. Drospirenone is an analogue of spironolactone with antimineralocorticoid and antiandrogenic activities.

1223 Chronic anovulation is associated with an increased risk of ?

N Engl J Med 2005;352:1223-36

- A. Endometrial carcinoma
- B. Cervical carcinoma
- C. Vaginal carcinoma
- D. All of the above

In PCOS, there is increased prevalence of endometrial hyperplasia and carcinoma due to the persistent stimulation of endometrial tissue by estrogen without progesterone-induced inhibition of proliferation and differentiation to secretory endometrium.

1224 Teratogenic effect of which of the following drugs produces "Neural-tube defects" ?

N Engl J Med 1998;338:1129

- A. Warfarin
- B. Thalidomide
- C. Carbamazepine
- D. Tetracycline

1225 Teratogenic effect of which of the following drugs produces "Neural-tube defects" ?

N Engl J Med 1998;338:1129

- A. Warfarin
- B. Thalidomide
- C. Valproic acid
- D. Tetracycline

1226 Teratogenic effect of which of the following drugs produces "Ebstein's anomaly" ?

N Engl J Med 1998;338:1129

- A. Angiotensin-converting-enzyme inhibitors
- B. Lithium
- C. Carbamazepine
- D. Misoprostol

1227 Teratogenic effect of which of the following drugs produces "Moebius sequence" ?

N Engl J Med 1998;338:1129

- A. Angiotensin-converting-enzyme inhibitors
- B. Lithium
- C. Carbamazepine
- D. Misoprostol

1228 Teratogenic effect of which of the following drugs produces "Dandy-Walker syndrome" ?

N Engl J Med 1998;338:1129

- A. Angiotensin-converting-enzyme inhibitors
- B. Lithium
- C. Carbamazepine
- D. Warfarin

1229 Teratogenic effect of which of the following drugs produces "aplasia cutis" ?

N Engl J Med 1998;338:1129

- A. Angiotensin-converting-enzyme inhibitors
- B. Methimazole
- C. Carbamazepine
- D. Warfarin

1230 Teratogenic effect of which of the following drugs produces "necrotizing enterocolitis" ?

N Engl J Med 1998;338:1129

- A. Nonsteroidal antiinflammatory drugs
- B. Methimazole
- C. Carbamazepine
- D. Valproic acid

1231 Teratogenic effect of which of the following drugs produces "decreased skull ossification" ?

N Engl J Med 1998;338:1129

- A. Nonsteroidal antiinflammatory drugs
- B. Angiotensin-converting enzyme inhibitors
- C. Carbamazepine
- D. Valproic acid

1232 Teratogenic effect of which of the following drugs produces "Masculinization of female fetuses" ?

N Engl J Med 1998;338:1129

- A. Nonsteroidal antiinflammatory drugs
- B. Danazol
- C. Diethylstilbestrol
- D. Misoprostol

1233 Teratogenic effect of which of the following drugs produces "renal tubular dysgenesis" ?

N Engl J Med 1998;338:1129

- A. Nonsteroidal antiinflammatory drugs
- B. Angiotensin-converting-enzyme inhibitors
- C. Diethylstilbestrol
- D. Misoprostol

1234 Retinoid embryopathy caused by teratogenic effect of "Isotretinoin" includes all except ?

N Engl J Med 1998;338:1129

- A. Optic-nerve blindness
- B. Hypoplasia of nails
- C. Thymic defects
- D. Spontaneous abortion

1235 Fetal hydantoin syndrome caused by teratogenic effect of "Phenytoin" includes all except ?

N Engl J Med 1998;338:1129

- A. Short nose with broad nasal bridge
- B. Epicanthus
- C. Webbed neck
- D. Micrognathia

1236 Fetal warfarin syndrome caused by teratogenic effect of "Warfarin" includes all except ?

N Engl J Med 1998;338:1129

- A. Agenesis of corpus callosum
- B. Dandy-Walker malformations
- C. Webbed neck
- D. Hearing loss

1237 Fetal Minamata disease is caused by the teratogenic effect of which of the following drug ?

N Engl J Med 1998;338:1129

- A. Warfarin
- B. Methyl mercury
- C. Hydantoin
- D. Thalidomide

Vitamin D

1238 Vitamin D is better related to which of the following ?

Harrison's 17th Ed. 2373

- A. Vitamin
- B. Hormone
- C. Enzyme
- D. All of the above

Vitamin D & its metabolites are hormones & hormone precursors rather than vitamins, since they can be synthesized endogenously.

1239 UV radiation of skin leads to synthesis of Vitamin D from ?

Harrison's 17th Ed. 2373

- A. 5-dehydrocholesterol
- B. 6-dehydrocholesterol
- C. 7-dehydrocholesterol
- D. 8-dehydrocholesterol

In response to ultraviolet radiation of skin, a photochemical cleavage results in formation of vitamin D from 7-dehydrocholesterol.

1240 Which of the following statements about Vitamin D is false ?

Harrison's 17th Ed. 2373

- A. Vitamin D from plant sources is vitamin D₂
- B. Vitamin D from animal sources is vitamin D₃
- C. D₂ has more biologic activity than D₃
- D. 25(OH)D is major circulating & storage form of vitamin D

Vitamin D from plant sources is vitamin D₂ whereas that from animal sources is vitamin D₃. Both have equivalent biologic activity & are activated equally by vitamin D hydroxylases. 25-hydroxyvitamin D [25(OH)D] is the major circulating & storage form of vitamin D.

1241 The half-life of 25(OH)D is approximately ?

Harrison's 17th Ed. 2374

- A. 1 - 12 hours
- B. 1 - 2 weeks
- C. 2 - 3 weeks
- D. 4 - 6 weeks

The half-life of 25(OH)D is ~ 2 - 3 weeks.

1242 The formation of the mature Vitamin D hormone occurs in ?

Harrison's 17th Ed. 2374

- A. Liver

- B. Kidney
- C. Skin
- D. All of the above

The formation of the mature Vitamin D hormone occurs in the kidney after second hydroxylation.

1243 Drugs associated with increased risk of generalized osteoporosis in adults include all except ?

Harrison's 16th Ed. 2271

- A. Aluminum
- B. Gonadotropin-releasing hormone agonists
- C. Protamine
- D. Lithium

1244 Biochemical markers of bone formation include all except ?

Harrison's 16th Ed. 2273

- A. Serum bone-specific alkaline phosphatase
- B. Serum bone sialoprotein
- C. Serum osteocalcin
- D. Serum propeptide of type I procollagen

1245 Biochemical markers of bone resorption include all except ?

Harrison's 16th Ed. 2273

- A. Serum tartrate-resistant acid phosphatase
- B. Serum bone sialoprotein
- C. Serum osteocalcin
- D. Urine hydroxyproline

1246 25(OH)D-1 α hydroxylase is expressed in ?

Harrison's 16th Ed. 2246

- A. Proximal convoluted tubule cells
- B. Cells of loop of Henle
- C. Distal convoluted tubule cells
- D. All of the above

1247 1 α hydroxylase is produced in the granulomas of ?

Harrison's 16th Ed. 2246

- A. Sarcoidosis
- B. Tuberculosis
- C. Berylliosis
- D. All of the above

1248 Vitamin D receptor (VDR) is what kind of a receptor ?

Harrison's 16th Ed. 2246

- A. Cell membrane
- B. Nuclear
- C. Mitochondrial
- D. Endoplasmic reticulum

1249 Normally, Vitamin D receptor (VDR) has maximum affinity for ?

Harrison's 16th Ed. 2247

- A. 25(OH)D₂
- B. 25(OH)D₃
- C. 1,25(OH)₂D
- D. All of the above

1250 Active transport of calcium across enterocytes is a function of ?

Harrison's 16th Ed. 2247

- A. Calbindin 9K
- B. ECaC
- C. ICaC
- D. All of the above

1251 1,25(OH)₂D has an antiproliferative effect on ?

Harrison's 16th Ed. 2247

- A. Keratinocytes
- B. Breast cancer cells
- C. Prostate cancer cells
- D. All of the above

1252 Accelerated loss of vitamin D due to increased metabolism is due to all except ?

Harrison's 16th Ed. 2247

- A. Barbiturates
- B. Phenytoin
- C. Rifampin
- D. Isoniazid

1253 Impaired 1 α hydroxylation leading to improper activation of vitamin D is due to all except ?

Harrison's 16th Ed. 2247

- A. Hypoparathyroidism
- B. Renal failure
- C. Liver disease
- D. Ketoconazole

1254 Which of the following drugs causes impaired 25-hydroxylation of Vitamin D₃ ?

Harrison's 16th Ed. 2247

- A. Phenytoin
- B. Rifampin
- C. Isoniazid
- D. Ketoconazole

1255 Radiologic feature of osteomalacia 'Looser's zones' is related to ?

Harrison's 16th Ed. 2248

- A. Nerves
- B. Arteries
- C. Veins
- D. Lymph nodes

1256 In patients whose 1 α hydroxylation is impaired, which of the following vitamin D analogues is given ?

Harrison's 16th Ed. 2248

- A. Dihydroxycholesterol (DHT)
- B. 1,25(OH)₂D₃
- C. 1 α hydroxyvitamin D₂
- D. Any of the above

1257 What level of urinary calcium excretion predisposes to nephrolithiasis ?

Harrison's 16th Ed. 2249

- A. > 50 mg/day

- B. > 100 mg/day
- C. > 175 mg/day
- D. > 250 mg/day

1258 Burnett's syndrome is related to ?

Harrison's 16th Ed. 2259

- A. Aluminum Intoxication
- B. Milk-Alkali Syndrome
- C. Vitamin A Intoxication
- D. Thiazides diuretics

Chapter 355. Paget's Disease and Other Dysplasias of Bone

1259 Number of nuclei in the normal osteoclast is ?

Harrison's 18th Ed. 3137

- A. 1 - 3
- B. 3 - 5
- C. 5 - 8
- D. 8 - 12

1260 Principal abnormality in Paget disease is ?

Harrison's 18th Ed. 3137

- A. Increased number of osteoclasts
- B. Increased activity of osteoclasts
- C. Increased size of osteoclasts
- D. All of the above

Principal abnormality in Paget disease is the increased number and activity of osteoclasts. Pagetic osteoclasts are large.

1261 In Paget disease of bone, which of the following is the most common presenting symptom ?

Harrison's 18th Ed. 3137

- A. Pain
- B. Paresthesias
- C. Diplopia
- D. Warmth over underlying pagetic lesion

Pain is the most common presenting symptom.

1262 Which of the following is a marker of bone resorption ?

N Engl J Med 2006;355:593-600

- A. Urinary Oxy pyridinoline
- B. Urinary pyridinoline
- C. Urinary deoxypyridinoline
- D. All of the above

Markers of bone resorption are urinary deoxypyridinoline & cross-linked N-telopeptide of type I collagen.

1263 Inheritance of Juvenile Paget's disease is ?

Harrison's 18th Ed. 3136

- A. Autosomal recessive
- B. Autosomal dominant
- C. X linked
- D. Any of the above

TNFRSF11B gene encodes osteoprotegerin with an autosomal dominant pattern of inheritance with variable penetrance. Its homozygous deletion causes juvenile Paget disease which is characterized by uncontrolled osteoclastic differentiation & resorption.

1264 Howship's lacunae is related to which of the following ?

Harrison's 17th Ed. 2408

- A. Osteoclast development
- B. Osteoclast-mediated resorption of bone
- C. Osteoblast progenitors
- D. Osteoclast progenitors

Osteoclast-mediated resorption of bone takes place in scalloped spaces called Howship's lacunae where the osteoclasts are attached through a specific integrin to components of the bone matrix such as osteopontin.

1265 Gene which encodes osteoprotegerin is ?

Harrison's 18th Ed. 3136

- A. TNFRSF11A
- B. TNFRSF11B
- C. TNFRSF11C
- D. TNFRSF11D

TNFRSF11B gene encodes osteoprotegerin.

1266 Which of the following is a marker of bone formation ?

Harrison's 18th Ed. 3137

- A. Serum ALP
- B. Serum AST
- C. Urinary hydroxyproline
- D. All of the above

Serum ALP and urinary hydroxyproline levels are markers of bone formation & resorption respectively.

1267 Which of the following is a product of type I collagen degradation ?

Harrison's 18th Ed. 3138

- A. Serum deoxypyridinoline
- B. Serum N-telopeptide
- C. Serum C-telopeptide
- D. All of the above

Urinary and serum deoxypyridinoline, N-telopeptide, and C-telopeptide levels are products of type I collagen degradation.

1268 Which of the following is not a urine or serum bone resorption marker ?

Harrison's 18th Ed. 3137

- A. Deoxypyridinoline
- B. Osteocalcin
- C. N-telopeptide
- D. C-telopeptide

Urine or serum bone resorption markers include pyridinoline, deoxypyridinoline, N-telopeptide and C-telopeptide, while serum markers of bone formation are ALP and osteocalcin.

1269 Which of the following is an intravenous bisphosphonate ?

N Engl J Med 2006;355:593-600

- A. Zoledronic acid
- B. Olpadronate
- C. Pamidronate

- D. All of the above

Intravenous bisphosphonates are pamidronate, zoledronic acid & olpadronate.

1270 Which of the following is an intravenous bisphosphonate ?

N Engl J Med 2006;355:593-600

- A. Etidronate disodium
B. Tiludronate disodium
C. Risedronate sodium
D. None of the above

1271 Potencies of various bisphosphonates are expressed relative to that of ?

Harrison's 17th Ed. 2409

- A. Alendronate
B. Risedronate
C. Pamidronate
D. Etidronate

Potencies of various bisphosphonates are expressed relative to that of etidronate.

1272 Which of the following is a 1st generation oral bisphosphonate ?

Harrison's 18th Ed. 3139

- A. Tiludronate
B. Alendronate
C. Risedronate
D. Etidronate

Second-generation oral bisphosphonates include tiludronate, alendronate, and risedronate.

1273 Radiographic finding of Paget disease include ?

Harrison's 18th Ed. 3137

- A. Osteoporosis circumscripta
B. Picture frame vertebra
C. Ivory vertebra
D. All of the above

1274 Brim sign refers to ?

Harrison's 18th Ed. 3137

- A. Thickening of diploic skull areas
B. Thickened & sclerotic ileopectinal line
C. Vertebral cortical thickening
D. Diffuse radiodense enlargement of a vertebra

In Paget's disease of bone, skull radiographs show regions of "cotton wool" or osteoporosis circumscripta, thickening of diploic areas, enlargement & sclerosis of a portion or all of one or more skull bones. Vertebral cortical thickening of the superior & inferior end plates creates a "picture frame" vertebra. Diffuse radiodense enlargement of a vertebra is referred to as "ivory vertebra." Pelvic radiographs show disruption or fusion of sacroiliac joints, porotic & radiodense lesions of ilium with whorls of coarse trabeculation, thickened & sclerotic ileopectinal line (Brim sign), and softening with protrusio acetabuli, with axial migration of hips & functional flexion contracture.

Chapter 357. Hemochromatosis

1275 Which of the following is the major clinical manifestation of hemochromatosis ?

Harrison's 18th Ed. 3162

- A. Diabetes mellitus
B. Cardiomyopathy

- C. Hypogonadotropic hypogonadism

- D. All of the above

Major clinical manifestation of hemochromatosis are cirrhosis of liver, diabetes mellitus, arthritis, cardiomyopathy, and hypogonadotropic hypogonadism.

1276 Which of the following cell types determine body iron content & distribution ?

N Engl J Med 2012;366:348-59

- A. Duodenal enterocytes
B. Erythroid precursors
C. Reticuloendothelial macrophages
D. All of the above

Four major cell types determine body iron content & distribution. They are duodenal enterocytes (dietary iron absorption), erythroid precursors (iron utilization), reticuloendothelial macrophages (iron storage & recycling), and hepatocytes (iron storage & endocrine regulation).

1277 Which of the following is the first step in iron metabolism ?

N Engl J Med 2012;366:348-59

- A. Reduction
B. Absorption
C. Storage
D. Transfer

Dietary iron is absorbed primarily by duodenal enterocytes. After the iron is reduced at the apical membrane, it is taken into the cell through the divalent metal transporter 1 (DMT1). Export of iron from enterocytes to plasma occurs through the basolateral transporter ferroportin. Iron is stored as ferritin and is lost on sloughing of senescent enterocyte.

1278 Which of the following regulates iron metabolism ?

N Engl J Med 2012;366:348-59

- A. Oxygen tension in enterocytes
B. Intracellular iron levels
C. Systemic iron needs
D. All of above

Regulation of each step of iron metabolism (reduction, absorption, storage, and transfer) is mediated by signals reflecting oxygen tension in enterocytes, intracellular iron levels, and systemic iron needs.

1279 Enterocyte tension regulates iron absorption through ?

N Engl J Med 2012;366:348-59

- A. Hypoxia-inducible factor 2 α (HIF-2 α)
B. Hypoxia-inducible factor 2 β (HIF-2 β)
C. Hypoxia-inducible factor 2 δ (HIF-2 δ)
D. Hypoxia-inducible factor 2 γ (HIF-2 γ)

Enterocyte tension regulates iron absorption through its effects on transcription factor hypoxia-inducible factor 2 α (HIF-2 α) & subsequent changes in transcription of DMT1 & ferroportin.

1280 Enterocyte iron content regulates iron absorption through ?

N Engl J Med 2012;366:348-59

- A. Iron absorption protein
B. Iron metabolism protein
C. Iron regulatory protein
D. Iron synthesis protein

Enterocyte iron content regulates iron absorption through its effects on iron regulatory protein (IRP) types 1 & 2 and their subsequent effects on messenger RNAs (mRNAs) encoding DMT1, ferroportin, ferritin, and HIF-2 α . The IRPs bind to sequences (iron-responsive elements [IREs]) that influence mRNA translation (with respect to ferroportin, ferritin, and HIF-2 α) or stability (with respect to DMT1). The IRE-IRP system increases ferritin mRNA translation in response to cellular iron.

1281 Systemic regulation of iron absorption is mediated by ?*N Engl J Med 2012;366:348-59*

- A. Hepcidin
- B. Ferroportin
- C. Ferritin
- D. DMT1

Systemic regulation of iron absorption is mediated by hormone hepcidin. Hepcidin binds to iron exporter ferroportin & induces its degradation, thus decreasing transfer of iron from enterocytes to the circulation. Hepcidin blocks release of iron from enterocytes & reticuloendothelial macrophages by degrading the iron exporter ferroportin. In duodenal enterocyte, iron export from RE cells is mediated by ferroportin and regulated by hepcidin.

1282 Plasma iron transport protein is ?*N Engl J Med 2012;366:348-59*

- A. Hepcidin
- B. Ferroportin
- C. Transferrin
- D. Ferritin

Iron released from enterocytes basolateral membrane binds to free sites on the plasma iron transport protein transferrin. Normal transferrin saturation is ~30%.

1283 Non transferrin bound iron (NTBI) is best related to ?*N Engl J Med 2012;366:348-59*

- A. Acetate
- B. Butyrate
- C. Citrate
- D. Sulphate

When transferrin becomes highly saturated, additional iron released into circulation is bound to low-molecular-weight compounds like citrate. This non-transferrin bound iron (NTBI) is readily taken up by hepatocytes & cardiomyocytes. Excess uptake of iron as NTBI produces oxidant-mediated cellular injury. A fraction of circulating NTBI is redox-active & is designated labile plasma iron. NTBI cannot be used for production of heme which requires transferrin-bound iron.

1284 Transferrin receptor 1 (TfR1) is best related to ?*N Engl J Med 2012;366:348-59*

- A. Non-transferrin bound iron (NTBI)
- B. Entry of iron-bound transferrin into cells
- C. Labile plasma iron
- D. Recycling endosomes

Erythroid precursor cells regulate intake of transferrin-bound iron by altering expression of surface transferrin receptor 1 (TfR1). TfR1 mediates entry of iron-bound transferrin (ferri-transferrin) into recycling endosomes.

1285 Which of the following represents the most dynamic iron compartment ?*N Engl J Med 2012;366:348-59*

- A. Liver
- B. Intestinal cells
- C. Reticuloendothelial macrophages
- D. Bone marrow

Reticuloendothelial cells serve as the major hepcidin-regulated iron storehouse. At equilibrium, RE cells release ~25 mg of iron per day. As the pool of circulating transferrin iron is <3 mg, RE cells represent the most dynamic iron compartment, turning over ~10 times per day.

1286 Reticuloendothelial cells obtain most of their iron from ?*N Engl J Med 2012;366:348-59*

- A. Phagocytosis of senescent erythrocytes
- B. Labile plasma iron

- C. Circulating transferrin iron
- D. Non-transferrin bound iron (NTBI)

Reticuloendothelial cells obtain most of their iron from phagocytosis of senescent erythrocytes.

1287 Ferritin is composed of how many ferritin monomers ?*N Engl J Med 2012;366:348-59*

- A. 6
- B. 12
- C. 18
- D. 24

Ferritin is an iron-storage protein complex composed of 24 ferritin monomers of two subtypes - heavy & light chains. Relative proportion of these ferritin chains in the complex varies in various tissues. Heavy-chain ferritin has ferroxidase activity, which is required for the efficient oxidation of incoming ferrous iron, whereas light-chain ferritin promotes efficient nucleation and mineralization.

1288 Hepatocytes are an important site of iron storage in the form of ?*N Engl J Med 2012;366:348-59*

- A. Ferritin
- B. Hemosidrin
- C. Transferrin
- D. Ferroportin

Hepatocytes are an important site of iron storage in the form of ferritin. NTBI is a major contributor to iron loading in hepatocytes under conditions of elevated transferrin saturation.

1289 Which of the following is called as "hypoferremia hormone" ?*N Engl J Med 2012;366:348-59*

- A. Ferroportin
- B. Hepcidin
- C. Transferrin
- D. Hemosidrin

Hepatocytes serve a central role in iron homeostasis as the site of regulated production of hormone hepcidin. Hepcidin functions as the "hypoferremia hormone" by down-regulating ferroportin-mediated release of iron into circulation. The consequent iron retention in duodenal enterocytes decreases dietary iron absorption. Iron retention in RE macrophages decreases iron turnover.

1290 Hepatocellular hepcidin production is regulated by ?*N Engl J Med 2012;366:348-59*

- A. Inflammation
- B. Iron status
- C. Erythropoietic activity
- D. All of the above

Hepatocellular hepcidin production is regulated by signals reflecting inflammation, iron status, erythropoietic activity, and oxygen tension.

1291 Hepcidin is which type of acute-phase protein ?*N Engl J Med 2012;366:348-59*

- A. Type I
- B. Type II
- C. Type III
- D. Type IV

Hepcidin is a type II acute-phase protein that mediates hypoferremia associated with infection and inflammation.

1292 Hepcidin has structural properties similar to those of ?*N Engl J Med 2012;366:348-59*

- A. Leukotriene B₄

- B. E-selectin
- C. Cathepsin G
- D. Defensins

Hepcidin protein was originally identified as an antimicrobial peptide with structural properties similar to defensins. Defensins are a family of cysteine-rich polypeptides with broad antimicrobial activity against bacteria, fungi, and certain enveloped viruses. Other antimicrobial peptides include cathelin, protegrin, granulysin, histatin, secretory leukoprotease inhibitor, and probiotics.

1293 The inflammatory signal up-regulating hepcidin expression is largely mediated by ?

N Engl J Med 2012;366:348-59

- A. Leptin
- B. Interleukin-6
- C. Granulocyte-macrophage colony-stimulating factor
- D. Lymphotoxin

The inflammatory signal up-regulating hepcidin expression is largely mediated by interleukin-6.

1294 Hemochromatosis due to hepcidin mutation is referred to as ?

Harrison's 18th Ed. 3162

- A. Type 1
- B. Type 2A
- C. Type 2B
- D. Type 3

Type 1 Hemochromatosis is HFE-related. Type 2A is non-HFE-related caused by hemojuvelin mutations and is called Juvenile hemochromatosis (type 2A). Type 2B is non-HFE-related caused by hepcidin mutation and is called Juvenile hemochromatosis (type 2B). Type 3 hemochromatosis is due to mutated transferrin receptor 2 TFR2 while type 4 hemochromatosis is due to mutated ferroportin 1 gene, SLC11A3. HFE mutation related hemochromatosis results in lack of cell surface expression of HFE (due to the C282Y mutation).

1295 Which of the following is a secondary iron overload state ?

Harrison's 18th Ed. 3162

- A. Sideroblastic anemia
- B. Porphyria cutanea tarda
- C. Hepatitis C
- D. All of the above

1296 Which of the following is a secondary iron overload state ?

Harrison's 18th Ed. 3162

- A. Thalassemia major
- B. Aceruloplasminemia
- C. Congenital atransferrinemia
- D. All of the above

Acquired iron overload states include Thalassemia major, Sideroblastic anemia, Chronic hemolytic anemias, Transfusional and parenteral iron overload, Dietary iron overload, Hepatitis C, Alcoholic cirrhosis, Nonalcoholic steatohepatitis, Porphyria cutanea tarda, Dysmetabolic iron overload syndrome, Post-portacaval shunting, Neonatal iron overload, Aceruloplasminemia, Congenital atransferrinemia.

1297 Which of the following about hemochromatosis is false ?

N Engl J Med 2004;350:2383-97

- A. Autosomal recessive
- B. Symptomatic organ involvement begins in midlife
- C. Hematologic anomalies are not usually seen
- D. None of the above

Although iron metabolism is abnormal, erythropoiesis is not jeopardized, and hematologic anomalies are not usually seen.

1298 HFE gene is located on which of the following chromosome ?

Harrison's 18th Ed. 3162

- A. 4
- B. 5
- C. 6
- D. 7

HFE stands for High Iron Fe. HFE gene is located on short arm of chromosome 6 at location 6p21.3 and encodes human hemochromatosis protein also known as the HFE protein.

1299 Which of the following is the most common mutation in hemochromatosis ?

Harrison's 18th Ed. 3162

- A. H63D
- B. H95D
- C. C282Y
- D. C126Y

A homozygous G to A mutation resulting in a cysteine to tyrosine substitution at position 282 (C282Y) is the most common mutation in HFE gene responsible for hemochromatosis. HFE mutation H63D results in a substitution of histidine to aspartic acid at codon 63.

1300 In hemochromatosis, progressive accumulation of iron increases which of the following ?

Harrison's 18th Ed. 3163

- A. Plasma iron
- B. Saturation of transferrin
- C. Plasma ferritin
- D. All of the above

In hemochromatosis, mucosal absorption of iron is greater than body requirements and amounts to 4 mg/day or more. In hemochromatosis, progressive accumulation of iron increases plasma iron, saturation of transferrin, and results in a progressive increase of plasma ferritin.

1301 Crucial molecule in iron metabolism that links body stores with intestinal iron absorption is ?

Harrison's 18th Ed. 3163

- A. Ferroportin (FPN)
- B. Iron oxidase hephaestin (Heph)
- C. Hepcidin
- D. Duodenal cytochrome B (DcytB)

Hepcidin is the crucial molecule in iron metabolism, linking body stores with intestinal iron absorption. Alcohol suppresses hepatic hepcidin secretion.

1302 Hepcidin responds to changes in body-iron requirements through which of the following ?

Harrison's 18th Ed. 3163

- A. HFE & Tfr2
- B. Hemojuvelin (HJV)
- C. Bone Morphogenetic Protein (BMP)/SMAD pathway
- D. All of the above

Hepcidin responds to changes in body-iron requirements by signals mediated by diferric transferrin through two mechanisms. One involves HFE & Tfr2, while the other involves hemojuvelin (HJV) & Bone Morphogenetic Protein (BMP)/SMAD pathway.

1303 Dietary inorganic iron is reduced from ferric (Fe³⁺) iron to ferrous (Fe²⁺) state by ?

Harrison's 18th Ed. 3163

- A. Ferroportin (FPN)
- B. Iron oxidase hephaestin (Heph)

- C. Duodenal cytochrome B (DcytB)
- D. DMT1

Dietary inorganic iron traverses the brush border membrane of duodenal enterocytes via DMT1 after reduction of ferric (Fe³⁺) iron to the ferrous (Fe²⁺) state by duodenal cytochrome B (DcytB).

1304 Hepcidin binds to which of the following ?

Harrison's 18th Ed. 3163

- A. Ferroportin
- B. Transferrin
- C. Hemosidrin
- D. All of the above

Iron moves from enterocyte to the circulation via a process requiring basolateral iron exporter ferroportin (FPN) and iron oxidase hephaestin (Heph). In the circulation, iron binds to plasma transferrin. Hepcidin is a liver-derived peptide that represses basolateral iron transport in intestine & iron release from macrophages and other cells by binding to ferroportin. Hepcidin, in turn, responds to signals in liver mediated by HFE, Tfr2, and hemojuvelin. Mutations in genes encoding HFE, Tfr2, hemojuvelin and hepcidin lead to decreased hepcidin release and increased iron absorption, resulting in hemochromatosis.

1305 Which of the following is false about HFE-related hemochromatosis ?

Harrison's 18th Ed. 3163

- A. HFE protein forms a complex with β_2 -microglobulin & transferrin receptor 1 (Tfr1)
- B. Reduced Tfr1-mediated iron uptake by intestinal crypt cell
- C. Upregulation of divalent metal transporter (DMT1) increases intestinal iron absorption
- D. None of the above

1306 Which is usually the first organ to be affected in hemochromatosis ?

Harrison's 18th Ed. 3164

- A. Liver
- B. Heart
- C. Pancreas
- D. Skin

Liver is usually the first organ to be affected in hemochromatosis, and hepatomegaly is present in >95% of symptomatic patients. The association of hepatomegaly, skin pigmentation, diabetes mellitus, heart disease, arthritis, and hypogonadism should suggest hemochromatosis.

1307 Bronzing or characteristic metallic or slate-gray skin pigmentation in hemochromatosis is due to ?

Harrison's 18th Ed. 3164

- A. Increased iron in the epidermis
- B. Decreased iron in the epidermis
- C. Increased iron in the dermis
- D. Decreased iron in the dermis

In hemochromatosis, characteristic metallic or slate-gray skin pigmentation referred to as bronzing results from increased melanin and iron in the dermis. Pigmentation is diffuse but more pronounced on face, neck, extensor aspects of lower forearms, dorsa of the hands, lower legs, and genital regions, as well as in scars.

1308 Which of the following is the least common in hemochromatosis ?

Harrison's 18th Ed. 3164

- A. Arthropathy
- B. Hepatomegaly
- C. Cardiac involvement
- D. Diabetes mellitus

Frequency of organ involvement in hemochromatosis is hepatomegaly (95%), Diabetes mellitus (65%), Arthropathy (25-50%), Cardiac involvement (15%).

1309 Which of the following is usually the first joint involved in hemochromatosis ?

Harrison's 18th Ed. 3164

- A. Wrist
- B. First metatarsophalangeal joint
- C. Second & third metacarpophalangeal joints
- D. Sternoclavicular joints

Joints of hands, especially second & third metacarpophalangeal joints, are usually the first joints involved in hemochromatosis. This feature helps to distinguish chondrocalcinosis associated with hemochromatosis from the idiopathic form.

1310 Which of the following is most common in hemochromatosis ?

Harrison's 18th Ed. 3165

- A. Hypogonadism
- B. Adrenal insufficiency
- C. Hypothyroidism
- D. Hypoparathyroidism

In hemochromatosis, hypogonadism due to impairment of hypothalamic-pituitary function by iron deposition occurs in both sexes and may antedate other clinical features. Adrenal insufficiency, hypothyroidism, and hypoparathyroidism are rare manifestations.

1311 Ingestion of which of the following promotes iron absorption ?

Harrison's 18th Ed. 3165

- A. Ascorbic acid
- B. Flavonoids
- C. Carotene
- D. Calcium

Ingestion of large doses of ascorbic acid promotes iron absorption.

1312 1 mL blood contains approximately how much iron ?

Harrison's 18th Ed. 3165

- A. 0.2 mg
- B. 0.3 mg
- C. 0.4 mg
- D. 0.5 mg

1 mL blood contains approximately 0.5 mg iron.

1313 An increase of 1 mg/L in serum ferritin level reflects an increase of about how much iron in body stores ?

Harrison's 18th Ed. 3165

- A. 2 mg
- B. 3 mg
- C. 4 mg
- D. 5 mg

An increase of 1 mg/L in serum ferritin level reflects an increase of about 5 mg iron in body stores.

1314 Which of the following is the strongest predictor of hemochromatosis expression in individuals homozygous for C282Y mutation ?

Harrison's 18th Ed. 3165

- A. Plasma iron
- B. Total iron-binding capacity
- C. Serum ferritin

D. C-reactive protein

Serum ferritin level >1000 mg/L is the strongest predictor of disease expression among individuals homozygous for the C282Y mutation.

1315 Which of the following indicates risk of severe fibrosis in a C282Y homozygous subject ?

Harrison's 18th Ed. 3165

- A. Serum ferritin level <1000 mg/L
- B. Normal serum alanine amino transaminase values
- C. No hepatomegaly
- D. None of the above

There is virtually no risk of severe fibrosis in a C282Y homozygous hemochromatosis subject with serum ferritin level <1000 mg/L, normal serum alanine amino transaminase values, no hepatomegaly, and no excess alcohol intake.

1316 Normal hepatic iron index is ?

Harrison's 18th Ed. 3165

- A. < 0.2
- B. < 0.5
- C. < 0.75
- D. < 1.0

Normal hepatic iron index is < 1. In symptomatic hemochromatosis it is > 2. In homozygotes with early, asymptomatic hemochromatosis it is between 1 and 2.

1317 One 500 mL unit of blood contains how much iron ?

Harrison's 18th Ed. 3166

- A. 20 - 25 mg
- B. 50 - 100 mg
- C. 100 - 200 mg
- D. 200 - 250 mg

One 500 mL unit of blood contains 200 - 250 mg iron, and up to 25 g iron or more may have to be removed.

1318 HFE mutations are related to which of the following diseases ?

Harrison's 18th Ed. 3167

- A. Porphyria cutanea tarda (PCT)
- B. Nonalcoholic steatosis (NASH)
- C. Chronic HCV infection
- D. All of the above

Also, subjects homozygous for C282Y are at increased risk of breast & colorectal cancer.

Chapter 358. Porphyrias

1319 Which of the following is a sporadic metabolic disorder ?

Harrison's 18th Ed. 3167

- A. Porphyria cutanea tarda (PCT)
- B. Acute intermittent porphyria (AIP)
- C. Hereditary coproporphyria (HCP)
- D. Variegate porphyria (VP)

Porphyrias are metabolic disorders due to deficiency of a specific enzyme in heme biosynthetic pathway. Porphyria cutanea tarda (PCT) is a sporadic disorder. Rest of the porphyrias are inherited either as autosomal dominant, autosomal recessive, or X-linked traits.

1320 The most common porphyria is ?

Harrison's 18th Ed. 3167

- A. Porphyria cutanea tarda (PCT)

- B. Acute intermittent porphyria (AIP)
- C. Hereditary coproporphyria (HCP)
- D. Variegate porphyria (VP)

Porphyrias are either hepatic or erythropoietic, depending on the primary site of overproduction and accumulation of their respective porphyrin precursors. PCT is the most common porphyria. It is hepatic and presents with blistering cutaneous photosensitivity, which is usually a manifestation of the erythropoietic porphyrias.

1321 Major manifestation of the acute hepatic porphyrias is ?

Harrison's 18th Ed. 3167

- A. Gastrointestinal
- B. Skin
- C. Neurologic
- D. Endocrinal

Major manifestations of acute hepatic porphyrias are neurologic (neuropathic abdominal pain, peripheral motor neuropathy, and mental disturbances).

1322 Erythropoietic porphyrias usually present with ?

Harrison's 18th Ed. 3167

- A. Gastrointestinal manifestations
- B. Skin manifestations
- C. Neurologic manifestations
- D. Endocrinal manifestations

Erythropoietic porphyrias usually present with cutaneous photosensitivity at birth or in early childhood, or in the case of congenital erythropoietic porphyria (CEP), even in utero as nonimmune hydrops fetalis. Cutaneous sensitivity to sunlight results from excitation of excess porphyrins in the skin by long-wave ultraviolet light, leading to cell damage, scarring, and disfigurement.

1323 Heme biosynthesis involves how many enzymatic steps in the conversion of glycine & succinyl-CoA to heme ?

Harrison's 18th Ed. 3167

- A. 2
- B. 4
- C. 6
- D. 8

Heme biosynthesis involves eight enzymatic steps in the conversion of glycine & succinyl-CoA to heme.

1324 Enzymes involved in heme biosynthesis are encoded by how many genes ?

Harrison's 18th Ed. 3167

- A. 4
- B. 7
- C. 9
- D. 12

Enzymes involved in heme biosynthesis are encoded by nine genes. The first enzyme 5?-aminolevulinate synthase (ALA-synthase) has two genes.

1325 The first enzyme in the heme biosynthesis pathway is ?

Harrison's 18th Ed. 3167

- A. 5'-aminolevulinate synthase (ALA-synthase)
- B. 5'-aminolevulinate dehydratase (ALA-dehydratase)
- C. Hydroxymethylbilane synthase (HMB-synthase or PBG-deaminase)
- D. Uroporphyrinogen III synthase (URO-synthase)

The first enzyme in the heme biosynthesis pathway is 5?-aminolevulinate synthase (ALA-synthase). It has two genes that encode unique housekeeping (ALAS1) and erythroid- specific (ALAS2) isozymes. The second enzyme, 5?-aminolevulinate dehydratase (ALA-dehydratase), third is

Hydroxymethylbilane synthase (HMB-synthase or PBG-deaminase), fourth is Uroporphyrinogen III synthase (URO-synthase), fifth is uroporphyrinogen decarboxylase (URO-decarboxylase), sixth is COPRO-oxidase, seventh is PROTO-oxidase, and eighth is ferrochelatase (heme synthetase or protoheme ferrolyase).

1326 Which of the following enzymes in the heme biosynthesis pathway is located in mitochondrion ?

Harrison's 18th Ed. 3167

- A. 5'-aminolevulinate synthase (ALA-synthase)
- B. 5'-aminolevulinate dehydratase (ALA-dehydratase)
- C. Hydroxymethylbilane synthase (HMB-synthase or PBG-deaminase)
- D. Uroporphyrinogen III synthase (URO-synthase)

The first and last three enzymes in the pathway are located in the mitochondrion, whereas the other four are in the cytosol.

1327 Heme is required for synthesis of which of the following ?

Harrison's 18th Ed. 3167

- A. Hemoglobin
- B. Myoglobin
- C. Cytochrome P450 enzymes (CYPs)
- D. All of the above

Heme is required for a variety of hemoproteins such as hemoglobin, myoglobin, respiratory cytochromes, and the cytochrome P450 enzymes (CYPs). Hemoglobin synthesis in erythroid precursor cells accounts for approximately 85% of daily heme synthesis in humans. Hepatocytes account for most of the rest, primarily for the synthesis of CYPs, which are especially abundant in the liver endoplasmic reticulum, and turn over more rapidly than many other hemoproteins, such as the mitochondrial respiratory cytochromes.

1328 To confirm the diagnosis of porphyria, laboratory measurement of porphyrin precursors is done in which of the following ?

Harrison's 18th Ed. 3167

- A. Urine
- B. Plasma
- C. Feces
- D. All of the above

Laboratory measurement of porphyrin precursors like 5?-aminolevulinic acid (ALA) and porphobilinogen (PBG) in urine, plasma, erythrocytes, or feces is required to confirm or exclude the diagnosis of porphyria.

1329 Which of the following is involved in the formation of ALA ?

Harrison's 18th Ed. 3169

- A. Glycine
- B. Pyridoxal phosphate
- C. Succinyl coenzyme A
- D. All of the above

The first enzyme, ALA-synthase, catalyzes the condensation of glycine, activated by pyridoxal phosphate and succinyl coenzyme A, to form ALA.

1330 Which of the following enzymes catalyzes the condensation of two molecules of ALA to form PBG ?

Harrison's 18th Ed. 3169

- A. 5'-aminolevulinate synthase (ALA-synthase)
- B. 5'-aminolevulinate dehydratase (ALA-dehydratase)
- C. Hydroxymethylbilane synthase (HMB-synthase or PBG-deaminase)
- D. Uroporphyrinogen III synthase (URO-synthase)

The second enzyme, 5?-aminolevulinate dehydratase (ALA-dehydratase), catalyzes the condensation of two molecules of ALA to form PBG.

1331 Head-to-tail condensation of how many PBG molecules forms HMB ?

Harrison's 18th Ed. 3169

- A. 1
- B. 2
- C. 3
- D. 4

Hydroxymethylbilane synthase (HMB-synthase or PBG-deaminase) catalyzes head-to-tail condensation of four PBG molecules to form the linear tetrapyrrole, HMB.

1332 Which of the following enters mitochondrion via transporter ABCB6 ?

Harrison's 18th Ed. 3169

- A. Porphobilinogen (PBG)
- B. Uroporphyrinogen (URO'gen) III
- C. Coproporphyrinogen (COPRO'gen) III
- D. Protoporphyrinogen (PROTO'gen) IX

The fifth enzyme, uroporphyrinogen decarboxylase (URO-decarboxylase), catalyzes the sequential removal of four carboxyl groups from acetic acid side chains of URO'gen III to form coproporphyrinogen (COPRO'gen) III, a tetracarboxylate porphyrinogen. Coproporphyrinogen (COPRO'gen) III enters mitochondrion via a specific transporter, ABCB6, where COPRO-oxidase, the sixth enzyme, catalyzes decarboxylation of two of the four propionic acid groups to form the two vinyl groups of protoporphyrinogen (PROTO'gen) IX, a decarboxylate porphyrinogen.

1333 PROTO-oxidase oxidizes PROTO IX'gen to protoporphyrin IX by the removal of ?

Harrison's 18th Ed. 3169

- A. Acetic acid side chains
- B. Propionic acid groups
- C. Hydrogen atoms
- D. Ferrous iron atoms

PROTO-oxidase oxidizes PROTO IX'gen to protoporphyrin IX by the removal of six hydrogen atoms to form porphyrin (oxidized form).

1334 Ferrochelatase is also called ?

Harrison's 18th Ed. 3169

- A. Heme decarboxylase
- B. Heme synthase
- C. Protoheme synthase
- D. Protoheme ferrolyase

Ferrous iron is inserted into protoporphyrin IX to form heme. This reaction is catalyzed by eighth enzyme, ferrochelatase (also known as heme synthetase or protoheme ferrolyase).

1335 Which of the following hepatic porphyrias present during adult life ?

Harrison's 18th Ed. 3170

- A. Acute intermittent porphyria (AIP)
- B. Hereditary coproporphyria (HCP)
- C. Variegate porphyria (VP)
- D. All of the above

Four of the five hepatic porphyrias - acute intermittent porphyria (AIP), hereditary coproporphyria (HCP), variegate porphyria (VP), and ALA-dehydratase porphyria (ADP) present during adult life with acute attacks of neurologic manifestations and elevated levels of one or both of the porphyrin precursors, ALA and PBG, and are thus classified as acute porphyrias. Patients with ADP have also presented in infancy and adolescence.

1336 Which of the following hepatic porphyrias have cutaneous manifestations ?

Harrison's 18th Ed. 3170

- A. Porphyria cutanea tarda (PCT)
- B. Hereditary coproporphyria (HCP)
- C. Variegate porphyria (VP)
- D. All of the above

The fifth hepatic disorder, porphyria cutanea tarda (PCT), presents with blistering skin lesions. HCP and VP also may have cutaneous manifestations similar to PCT.

1337 Which of the following erythropoietic porphyrias present with cutaneous photosensitivity ?

Harrison's 18th Ed. 3170

- A. Congenital erythropoietic porphyria (CEP)
- B. Erythropoietic protoporphyria (EPP)
- C. X-linked protoporphyria (XLP)
- D. All of the above

The erythropoietic porphyrias - congenital erythropoietic porphyria (CEP) & erythropoietic protoporphyria (EPP), including the recently described X-linked form, XLP are characterized by elevations of porphyrins in bone marrow and erythrocytes and present with cutaneous photosensitivity.

1338 A substantial increase in PBG is seen in ?

Harrison's 18th Ed. 3171

- A. AIP
- B. HCP
- C. VP
- D. All of the above

A substantial increase in PBG may be due to AIP, HCP, or VP.

1339 Urinary PBG is virtually always increased during acute attacks of ?

Harrison's 18th Ed. 3172

- A. AIP
- B. HCP
- C. VP
- D. All of the above

Urinary PBG is virtually always increased during acute attacks of AIP, HCP, and VP and is not substantially increased in any other medical condition.

1340 Which of the following is false about acute intermittent porphyria (AIP) ?

Harrison's 18th Ed. 3173

- A. Autosomal recessive
- B. Due to half-normal level of HMB-synthase activity
- C. Common in Scandinavia & Great Britain
- D. Almost always latent before puberty

Acute intermittent porphyria (AIP) is an autosomal dominant hepatic porphyria resulting from half-normal level of HMB-synthase activity. AIP is especially common in Scandinavia & Great Britain. AIP is almost always latent before puberty.

1341 Attacks of AIP can be provoked by ?

Harrison's 18th Ed. 3173

- A. Infections
- B. Surgery
- C. Ethanol
- D. All of the above

Attacks of AIP can be provoked by infections, surgery and ethanol.

1342 Which of the following is false about acute intermittent porphyria (AIP) ?

Harrison's 18th Ed. 3173

- A. Abdominal pain is the most common symptom
- B. Urinary retention is characteristic
- C. Peripheral neuropathy is due to axonal demyelination
- D. ALA & PBG levels increased in plasma & urine during acute attacks

In AIP, peripheral neuropathy is due to axonal degeneration rather than due to demyelination. ALA & PBG levels are substantially increased in plasma & urine during acute attacks. Urinary PBG excretion during an attack is 50 - 200 mg/day (normal is 0 - 4 mg/day), and urinary ALA excretion is 20 - 100 mg/day (normal is 1 - 7 mg/day).

1343 In AIP, excretion of ALA & PBG decrease dramatically after ?

Harrison's 18th Ed. 3176

- A. Intravenous glucose
- B. Intravenous hemin
- C. Intravenous calcium
- D. Intravenous amino acids

In AIP, excretion of ALA & PBG decrease dramatically after intravenous hemin.

1344 In AIP, treatment of seizures is preferred with the use of ?

Harrison's 18th Ed. 3173

- A. Clonazepam
- B. Phenytoin
- C. Barbiturates
- D. Any of the above

Treatment of seizures is difficult because most antiseizure drugs can exacerbate AIP. Clonazepam may be safer than phenytoin or barbiturates.

1345 In AIP, heme is given in the form of ?

Harrison's 18th Ed. 3176

- A. Lyophilized hematin
- B. Heme albumin
- C. Heme arginate
- D. All of the above

In AIP, 3 - 4 mg/kg of heme in the form of lyophilized hematin, heme albumin (hematin reconstituted with human albumin), or heme arginate is infused daily for 4 days.

1346 Long-term risk of which of the following is increased in AIP ?

Harrison's 18th Ed. 3177

- A. Hypertension
- B. Chronic renal disease
- C. Hepatocellular carcinoma
- D. All of the above

1347 Which of the following is deficient in all types of porphyria cutanea tarda (PCT) ?

Harrison's 18th Ed. 3177

- A.
- B.
- C. Hepatic URO-decarboxylase
- D. COPRO-oxidase

Porphyria cutanea tarda (PCT) is the most common of porphyrias. It can be either sporadic (type 1, with no URO-decarboxylase mutations) or familial (type 2, with URO-decarboxylase mutations) and develops after exposure to halogenated aromatic hydrocarbons. Hepatic URO-decarboxylase is deficient in all types of PCT.

1348 Which of the following is not an autosomal dominant hepatic porphyria ?

Harrison's 18th Ed. 3177

- A. Hereditary Coproporphyria (HCP)
- B. Variegate Porphyria (VP)
- C. Hepatoerythropoietic porphyria (HEP)
- D. Variegate Porphyria (VP)

Hepatoerythropoietic porphyria (HEP) is an autosomal recessive form of porphyria that results from the marked systemic deficiency of URO-decarboxylase activity with clinical symptoms in childhood.

1349 Susceptibility factor in type 2 PCT is ?

Harrison's 18th Ed. 3177

- A. Hepatitis C
- B. HIV
- C. Elevated iron levels
- D. All of the above

Susceptibility factors in inherited UROD mutations in type 2 PCT include hepatitis C, HIV, excess alcohol, elevated iron levels, and estrogens.

1350 In PCT, skin friability & small white papules on back of hands & fingers is called ?

Harrison's 18th Ed. 3177

- A. Milia
- B. Trichia
- C. Pilia
- D. Cryslia

In PCT, blistering skin lesions appear on back of hands that rupture & crust, leaving areas of atrophy & scarring. Skin friability & small white papules termed milia are common on back of hands and fingers.

1351 Which of the following statements about PCT is false ?

Harrison's 18th Ed. 3177

- A. Neurologic features are absent
- B. Hemochromatosis gene (HFE) mutations frequent
- C. Chronic liver disease present
- D. None of the above

1352 URO-decarboxylase activity in liver, erythrocytes is very significantly decreased in ?

Harrison's 18th Ed. 3177

- A. Type 1 Porphyria cutanea tarda
- B. Type 2 Porphyria cutanea tarda
- C. Hepatoerythropoietic porphyria (HEP)
- D.

URO-decarboxylase activity in liver, erythrocytes, and cultured skin fibroblasts in type 2 PCT is approximately 50% of normal in affected individuals. In HEP, URO-decarboxylase activity is markedly deficient, with typical levels of 3 - 10% of normal.

1353 Which of the following is useful in the treatment of porphyria cutanea tarda ?

Harrison's 18th Ed. 3178

- A. Pentamidine
- B. Hydroxyurea
- C. Chloroquine phosphate
- D. Quinine

In PCT, low dose of chloroquine phosphate (125 mg) twice weekly should be given, because standard doses can induce transient, sometimes marked increases in photosensitivity and hepatocellular damage.

1354 Diagnosis of Hereditary Coproporphyria (HCP) is confirmed by which of the following ?

Harrison's 18th Ed. 3178

- A. Urinary ALA
- B. Urinary PBG
- C. Plasma porphyrins
- D. Increased fecal porphyrins

Diagnosis of HCP is confirmed by increased fecal porphyrins consisting almost entirely of COPRO III, which distinguishes it from other porphyrias.

1355 Variegate porphyria (VP) results from the deficient activity of ?

Harrison's 18th Ed. 3178

- A.
- B. URO-synthase
- C. PROTO-oxidase
- D. COPRO-oxidase

VP is an autosomal dominant hepatic porphyria that results from the deficient activity of PROTO-oxidase.

1356 Variegate porphyria (VP) is particularly common in ?

Harrison's 18th Ed. 3178

- A. China
- B. Brazil
- C. Australia
- D. South Africa

VP is particularly common in South Africa, where 3 of every 1000 whites have the disorder. Missense mutation R59W is common mutation in PPOX gene.

1357 Which of the following is increased in Variegate porphyria (VP) ?

Harrison's 18th Ed. 3178

- A. Fecal protoporphyrin
- B. Plasma porphyrin
- C. Urinary COPRO III
- D. All of the above

1358 Which of the following is called Günther disease ?

Harrison's 18th Ed. 3179

- A. X-Linked Sideroblastic Anemia (XLSA)
- B. Congenital Erythropoietic Porphyria (CEP)
- C. Erythropoietic Protoporphyrin (EPP)
- D. Hepatoerythropoietic porphyria (HEP)

Congenital erythropoietic porphyria (CEP) is also called Günther disease.

1359 Which of the following is the most common erythropoietic porphyria in children ?

Harrison's 18th Ed. 3179

- A. X-Linked Sideroblastic Anemia (XLSA)
- B. Congenital Erythropoietic Porphyria (CEP)
- C. Erythropoietic Protoporphyrin (EPP)
- D. Hepatoerythropoietic porphyria (HEP)

Erythropoietic Protoporphyrin (EPP) results from deficient activity of ferrochelatase. EPP is the most common erythropoietic porphyria in children and, after PCT, the second most common porphyria in adults.

- 1360 Which of the following is an autosomal recessive disorder ?
Harrison's 18th Ed. 3179
- A. Hepatoerythropoietic porphyria (HEP)
 - B. Congenital Erythropoietic Porphyria (CEP)
 - C. Erythropoietic Protoporphyria (EPP)
 - D. All of the above

Chapter 360. Wilson's Disease

- 1361 Wilson disease is caused by mutations in ?
Harrison's 18th Ed. 3188
- A. ATP6B gene
 - B. ATP7B gene
 - C. ATP8B gene
 - D. ATP9B gene

Wilson disease is an autosomal recessive disorder caused by mutations in ATP7B gene.

- 1362 Clinical manifestations of Wilson disease are primarily due to involvement of ?
Harrison's 18th Ed. 3188
- A. Brain
 - B. Pancreas
 - C. Heart
 - D. Lung

As the disease progresses, clinical manifestations of Wilson disease are caused by copper toxicity that primarily involve liver and brain, leading to neurologic & psychiatric disease.

- 1363 Which of the following best relates to Wilson disease ?
Harrison's 18th Ed. 3188
- A. Metallothionein
 - B. Serum ferritin
 - C. Abetalipoproteinemia
 - D. Hematin

Excess hepatic copper due to ATP7B protein deficiency is bound to metallothionein.

- 1364 Which of the following best relates to Wilson disease ?
Harrison's 17th Ed. 2449
- A. M-type ATPase
 - B. N-type ATPase
 - C. P-type ATPase
 - D. S-type ATPase

P-type ATPase is required to export copper from hepatocyte. Mutations in ATP7B in Wilson disease causes retention of copper in liver leading to liver disease.

- 1365 Diagnosis of Wilson's Disease is done by finding ?
Harrison's 18th Ed. 3188
- A. Reduced blood ceruloplasmin level

- B. Increased urinary excretion of copper
- C. Elevated hepatic copper level
- D. All of the above

Diagnosis of Wilson's Disease includes demonstration of reduced blood ceruloplasmin level, increased urinary excretion of copper, Kayser-Fleischer rings in cornea & elevated hepatic copper level.

- 1366 Movement disorder in Wilson's Disease is ?
Harrison's 18th Ed. 3188
- A. Dystonia
 - B. Incoordination
 - C. Tremor
 - D. All of the above

Three main movement disorders in Wilson's Disease are dystonia, incoordination & tremor.

- 1367 Which of the following is not a feature of Wilson's Disease ?
Harrison's 18th Ed. 3188
- A. Orthostatic hypotension & sweating abnormalities
 - B. Parkinsonism
 - C. Sensory abnormalities
 - D. Memory loss

Sensory abnormalities and muscular weakness are not features of Wilson's disease.

- 1368 In Wilson's disease, penicillamine treatment should always be accompanied by ?
Harrison's 18th Ed. 3189
- A. Ascorbic acid
 - B. Pyridoxine
 - C. Thiamine
 - D. Cynacobalamin

Pyridoxine in doses of 25 mg/day should always be given with penicillamine.

- 1369 Which of the following best relates to Wilson's disease ?
Harrison's 18th Ed. 3189
- A. International Prognostic Index (IPI)
 - B. Hasford prognostic system
 - C. Halsted prognostic index
 - D. Nazer prognostic index

Nazer prognostic index includes Serum bilirubin, Serum aspartate transferase (AST), and Prolongation of prothrombin time (seconds). Patients with scores <7 can usually be managed with medical therapy. Patients with scores >9 should be considered immediately for liver transplantation.

- 1370 Which of the following is associated with pes cavus ?
- A. CMT1x
 - B. Friedreich's Ataxia
 - C. Nemaline Myopathy
 - D. All of the above

Pes cavus is associated with CMT1x, Friedreich's Ataxia, Nemaline Myopathy, Central Core Disease and Plantar Fasciitis.

[illegible]

ANSWERS ENDOCRINOLOGY

1 B	30 C	59 D	88 A	117 D	146 C
2 C	31 C	60 D	89 C	118 B	147 D
3 D	32 B	61 D	90 D	119 C	148 A
4 A	33 A	62 B	91 B	120 B	149 D
5 D	34 B	63 B	92 D	121 C	150 B
6 D	35 B	64 A	93 A	122 C	151 D
7 D	36 D	65 B	94 C	123 A	152 B
8 A	37 C	66 C	95 D	124 C	153 D
9 D	38 D	67 A	96 D	125 A	154 D
10 C	39 D	68 D	97 D	126 A	155 D
11 B	40 D	69 D	98 C	127 D	156 B
12 D	41 D	70 B	99 D	128 D	157 D
13 D	42 D	71 D	100 B	129 C	158 B
14 C	43 A	72 B	101 C	130 D	159 C
15 C	44 B	73 C	102 A	131 C	160 B
16 D	45 D	74 D	103 C	132 C	161 C
17 B	46 C	75 C	104 B	133 A	162 D
18 D	47 B	76 D	105 A	134 D	163 B
19 D	48 A	77 D	106 D	135 D	164 A
20 D	49 C	78 D	107 A	136 D	165 C
21 D	50 D	79 B	108 D	137 D	166 B
22 C	51 C	80 B	109 B	138 D	167 C
23 D	52 D	81 C	110 A	139 D	168 D
24 D	53 B	82 D	111 D	140 C	169 D
25 D	54 D	83 D	112 C	141 B	170 D
26 A	55 D	84 D	113 C	142 C	171 D
27 B	56 A	85 A	114 B	143 B	172 C
28 D	57 A	86 D	115 D	144 B	173 B
29 D	58 D	87 C	116 D	145 C	174 B

ANSWERS ENDOCRINOLOGY

175 B	204 D	233 D	262 A	291 C	320 C
176 A	205 A	234 D	263 C	292 D	321 B
177 D	206 A	235 A	264 B	293 C	322 D
178 D	207 A	236 B	265 D	294 C	323 D
179 D	208 C	237 C	266 D	295 C	324 C
180 B	209 D	238 D	267 C	296 A	325 A
181 D	210 D	239 D	268 D	297 B	326 A
182 B	211 A	240 D	269 A	298 D	327 B
183 C	212 D	241 B	270 B	299 B	328 A
184 A	213 D	242 B	271 B	300 D	329 D
185 A	214 C	243 B	272 D	301 D	330 D
186 A	215 A	244 B	273 D	302 B	331 D
187 D	216 B	245 D	274 C	303 A	332 D
188 B	217 C	246 B	275 C	304 C	333 B
189 C	218 C	247 A	276 A	305 A	334 B
190 A	219 D	248 C	277 A	306 C	335 C
191 A	220 D	249 C	278 C	307 C	336 A
192 D	221 D	250 D	279 D	308 D	337 C
193 D	222 A	251 D	280 B	309 D	338 B
194 A	223 C	252 B	281 D	310 A	339 D
195 A	224 D	253 C	282 D	311 A	340 A
196 B	225 B	254 D	283 C	312 C	341 C
197 C	226 B	255 C	284 C	313 D	342 C
198 A	227 B	256 B	285 D	314 C	343 B
199 C	228 C	257 B	286 D	315 D	344 A
200 B	229 D	258 D	287 D	316 A	345 A
201 B	230 C	259 D	288 C	317 A	346 D
202 D	231 D	260 A	289 B	318 D	347 B
203 D	232 D	261 D	290 D	319 B	348 A

ANSWERS ENDOCRINOLOGY

349 B	378 A	407 A	436 A	465 A	494 A
350 C	379 D	408 A	437 D	466 D	495 A
351 C	380 D	409 B	438 D	467 D	496 D
352 A	381 B	410 C	439 A	468 A	497 A
353 A	382 D	411 D	440 A	469 B	498 D
354 C	383 A	412 A	441 A	470 D	499 D
355 B	384 B	413 C	442 A	471 D	500 D
356 B	385 A	414 B	443 C	472 A	501 D
357 D	386 C	415 A	444 D	473 B	502 D
358 B	387 A	416 A	445 D	474 D	503 D
359 A	388 C	417 D	446 A	475 D	504 C
360 D	389 D	418 D	447 D	476 A	505 D
361 C	390 C	419 D	448 B	477 A	506 D
362 D	391 A	420 D	449 D	478 D	507 D
363 D	392 A	421 B	450 D	479 C	508 D
364 C	393 B	422 B	451 D	480 D	509 D
365 B	394 A	423 D	452 D	481 D	510 B
366 A	395 C	424 B	453 D	482 D	511 D
367 A	396 D	425 A	454 D	483 C	512 D
368 D	397 A	426 A	455 D	484 D	513 D
369 B	398 A	427 C	456 B	485 A	514 B
370 D	399 A	428 A	457 D	486 A	515 B
371 D	400 A	429 D	458 D	487 D	516 D
372 B	401 B	430 D	459 A	488 A	517 D
373 A	402 C	431 D	460 D	489 A	518 A
374 C	403 C	432 A	461 D	490 D	519 C
375 B	404 D	433 A	462 D	491 C	520 D
376 B	405 C	434 D	463 C	492 C	521 C
377 D	406 A	435 A	464 D	493 A	522 C

ANSWERS ENDOCRINOLOGY

523 B	552 D	581 B	610 D	639 B	668 B
524 D	553 A	582 C	611 B	640 D	669 B
525 C	554 C	583 C	612 D	641 A	670 C
526 B	555 B	584 D	613 B	642 C	671 B
527 D	556 A	585 D	614 A	643 D	672 D
528 D	557 D	586 C	615 B	644 C	673 D
529 D	558 A	587 C	616 D	645 C	674 A
530 D	559 D	588 D	617 C	646 B	675 D
531 D	560 D	589 B	618 D	647 C	676 D
532 C	561 D	590 D	619 D	648 B	677 D
533 D	562 A	591 A	620 A	649 C	678 A
534 B	563 D	592 A	621 A	650 D	679 B
535 C	564 D	593 D	622 D	651 B	680 C
536 C	565 D	594 D	623 B	652 A	681 D
537 B	566 D	595 D	624 C	653 D	682 B
538 D	567 C	596 D	625 B	654 D	683 B
539 B	568 D	597 B	626 D	655 D	684 B
540 D	569 C	598 A	627 D	656 C	685 D
541 A	570 B	599 B	628 D	657 C	686 D
542 A	571 A	600 D	629 D	658 C	687 D
543 C	572 D	601 D	630 C	659 C	688 C
544 D	573 D	602 B	631 C	660 A	689 D
545 C	574 C	603 D	632 C	661 C	690 D
546 D	575 D	604 C	633 B	662 D	691 D
547 A	576 C	605 C	634 C	663 D	692 A
548 D	577 D	606 C	635 B	664 B	693 A
549 C	578 D	607 D	636 C	665 A	694 D
550 D	579 B	608 B	637 D	666 C	695 B
551 D	580 D	609 D	638 B	667 B	696 A

ANSWERS ENDOCRINOLOGY

697 B	726 D	755 B	784 C	813 D	842 D
698 A	727 C	756 D	785 B	814 A	843 C
699 D	728 D	757 A	786 A	815 D	844 C
700 A	729 A	758 C	787 B	816 D	845 D
701 D	730 A	759 A	788 D	817 A	846 C
702 C	731 C	760 A	789 A	818 D	847 A
703 A	732 C	761 D	790 B	819 C	848 B
704 A	733 C	762 A	791 C	820 D	849 A
705 C	734 C	763 D	792 A	821 B	850 A
706 D	735 C	764 D	793 D	822 D	851 D
707 C	736 A	765 D	794 D	823 D	852 A
708 C	737 B	766 A	795 C	824 D	853 C
709 A	738 A	767 B	796 A	825 B	854 B
710 D	739 A	768 A	797 B	826 C	855 C
711 A	740 B	769 D	798 D	827 D	856 A
712 C	741 B	770 D	799 D	828 C	857 B
713 D	742 D	771 C	800 C	829 A	858 D
714 B	743 D	772 B	801 D	830 C	859 B
715 D	744 A	773 B	802 B	831 A	860 D
716 A	745 B	774 A	803 D	832 A	861 D
717 D	746 B	775 D	804 D	833 B	862 B
718 D	747 D	776 A	805 B	834 B	863 A
719 B	748 A	777 D	806 D	835 B	864 B
720 A	749 B	778 D	807 D	836 A	865 A
721 B	750 B	779 C	808 D	837 A	866 C
722 C	751 B	780 C	809 C	838 D	867 D
723 A	752 D	781 A	810 B	839 C	868 D
724 D	753 C	782 A	811 A	840 B	869 C
725 B	754 D	783 C	812 D	841 B	870 D

ANSWERS ENDOCRINOLOGY

871 D	900 A	929 A	958 B	987 C	1016 B
872 C	901 A	930 D	959 A	988 C	1017 D
873 A	902 B	931 A	960 D	989 B	1018 D
874 D	903 C	932 A	961 D	990 B	1019 C
875 B	904 B	933 C	962 A	991 D	1020 D
876 D	905 B	934 D	963 D	992 B	1021 B
877 D	906 C	935 D	964 A	993 D	1022 C
878 D	907 D	936 B	965 C	994 C	1023 D
879 B	908 B	937 D	966 D	995 B	1024 A
880 C	909 D	938 C	967 D	996 C	1025 A
881 A	910 D	939 D	968 D	997 C	1026 D
882 B	911 D	940 C	969 C	998 B	1027 D
883 B	912 A	941 A	970 A	999 C	1028 A
884 A	913 D	942 D	971 D	1000 C	1029 C
885 D	914 D	943 C	972 B	1001 D	1030 B
886 B	915 A	944 D	973 C	1002 D	1031 D
887 B	916 C	945 B	974 D	1003 B	1032 D
888 D	917 B	946 D	975 D	1004 D	1033 B
889 B	918 A	947 D	976 A	1005 D	1034 C
890 A	919 D	948 A	977 B	1006 B	1035 C
891 D	920 C	949 D	978 D	1007 B	1036 D
892 D	921 A	950 D	979 C	1008 A	1037 C
893 B	922 C	951 D	980 D	1009 B	1038 A
894 A	923 B	952 D	981 D	1010 A	1039 B
895 B	924 D	953 D	982 C	1011 C	1040 D
896 A	925 B	954 D	983 A	1012 D	1041 D
897 D	926 D	955 B	984 A	1013 D	1042 A
898 C	927 B	956 D	985 A	1014 D	1043 A
899 C	928 A	957 D	986 B	1015 A	1044 C

ANSWERS ENDOCRINOLOGY

1045 A	1074 D	1103 D	1132 A	1161 A	1190 B
1046 D	1075 D	1104 C	1133 D	1162 D	1191 C
1047 D	1076 D	1105 A	1134 D	1163 A	1192 B
1048 C	1077 B	1106 A	1135 C	1164 C	1193 B
1049 D	1078 A	1107 B	1136 B	1165 D	1194 D
1050 B	1079 D	1108 A	1137 D	1166 D	1195 B
1051 D	1080 D	1109 C	1138 A	1167 A	1196 A
1052 C	1081 B	1110 D	1139 D	1168 B	1197 C
1053 D	1082 C	1111 C	1140 C	1169 C	1198 A
1054 A	1083 D	1112 B	1141 D	1170 D	1199 C
1055 B	1084 B	1113 A	1142 D	1171 D	1200 D
1056 A	1085 B	1114 B	1143 D	1172 A	1201 C
1057 C	1086 A	1115 A	1144 A	1173 D	1202 B
1058 B	1087 C	1116 D	1145 D	1174 A	1203 D
1059 A	1088 B	1117 B	1146 D	1175 D	1204 D
1060 C	1089 B	1118 A	1147 C	1176 C	1205 C
1061 B	1090 D	1119 C	1148 D	1177 D	1206 D
1062 A	1091 C	1120 D	1149 C	1178 A	1207 D
1063 B	1092 A	1121 A	1150 B	1179 D	1208 D
1064 D	1093 D	1122 D	1151 A	1180 D	1209 C
1065 B	1094 C	1123 D	1152 D	1181 D	1210 A
1066 D	1095 C	1124 B	1153 B	1182 D	1211 B
1067 C	1096 C	1125 D	1154 A	1183 D	1212 D
1068 D	1097 C	1126 A	1155 D	1184 A	1213 C
1069 A	1098 D	1127 C	1156 D	1185 D	1214 D
1070 D	1099 C	1128 D	1157 D	1186 B	1215 B
1071 C	1100 B	1129 B	1158 C	1187 A	1216 A
1072 C	1101 D	1130 D	1159 D	1188 D	1217 D
1073 D	1102 D	1131 A	1160 B	1189 B	1218 D

ANSWERS ENDOCRINOLOGY

1219 A	1248 B	1277 A	1306 A	1335 D	1364 C
1220 B	1249 C	1278 D	1307 C	1336 D	1365 D
1221 D	1250 D	1279 A	1308 C	1337 D	1366 D
1222 D	1251 D	1280 C	1309 C	1338 D	1367 C
1223 A	1252 D	1281 A	1310 A	1339 D	1368 B
1224 C	1253 C	1282 C	1311 A	1340 A	1369 D
1225 C	1254 C	1283 C	1312 D	1341 D	1370 D
1226 B	1255 B	1284 B	1313 D	1342 C	
1227 D	1256 D	1285 C	1314 C	1343 B	
1228 D	1257 D	1286 A	1315 D	1344 A	
1229 B	1258 B	1287 D	1316 D	1345 D	
1230 A	1259 B	1288 A	1317 D	1346 D	
1231 B	1260 D	1289 B	1318 D	1347 C	
1232 B	1261 A	1290 D	1319 A	1348 C	
1233 B	1262 C	1291 B	1320 A	1349 D	
1234 B	1263 B	1292 D	1321 C	1350 A	
1235 D	1264 B	1293 B	1322 B	1351 D	
1236 C	1265 B	1294 C	1323 D	1352 C	
1237 B	1266 A	1295 D	1324 C	1353 C	
1238 B	1267 D	1296 D	1325 A	1354 D	
1239 C	1268 B	1297 D	1326 A	1355 C	
1240 C	1269 D	1298 C	1327 D	1356 D	
1241 C	1270 D	1299 C	1328 D	1357 D	
1242 B	1271 D	1300 D	1329 D	1358 B	
1243 C	1272 D	1301 C	1330 B	1359 C	
1244 B	1273 D	1302 D	1331 D	1360 D	
1245 C	1274 B	1303 C	1332 C	1361 B	
1246 A	1275 D	1304 A	1333 C	1362 A	
1247 D	1276 D	1305 D	1334 D	1363 A	

Chapter 366. Biology of Neurologic Diseases

- 1 What proportion of 23,000 genes encoded in human genome are expressed in human nervous system ?**

Harrison's 18th Ed. 3224

- A. ~ one-fourth
- B. ~ one-third
- C. ~ one-half
- D. ~ three-fourth

Over one-third of 23,000 genes encoded in human genome are expressed in human nervous system.

- 2 Each mature brain is composed of how many neurons ?**

Harrison's 18th Ed. 3224

- A. 10 million
- B. 100 million
- C. 10 billion
- D. 100 billion

- 3 Each mature brain is composed of how many synapses ?**

Harrison's 18th Ed. 3224

- A. ~ 10^{10}
- B. ~ 10^{15}
- C. ~ 10^{20}
- D. ~ 10^{25}

Each mature brain is composed of 100 billion neurons, several million miles of axons and dendrites, and $>10^{15}$ synapses.

- 4 Which of the following is a monogenic disorder ?**

Harrison's 18th Ed. 3224

- A. Familial Alzheimer's disease
- B. Frontotemporal dementia
- C. Parkinson's disease
- D. All of the above

Mutations of amyloid precursor protein in familial Alzheimer's disease, microtubule-associated protein tau (MAPT) in frontotemporal dementia & alpha-synuclein in Parkinson's disease represent monogenic causes of common phenotypes.

- 5 Nissl bodies are composed of ?**

- A. Mitochondria
- B. Endoplasmic reticulum
- C. Golgi complex
- D. Lysosomes

- 6 Synaptic glomeruli are found in ?**

Harrison's 16th Ed. 176

- A. Cerebellum
- B. Olfactory bulb
- C. Lateral geniculate body
- D. All of the above

- 7 What fraction of genes encoded in human genome is expressed in the nervous system ?**

Harrison's 16th Ed. 2339

- A. One-third
- B. One-half
- C. Two-third
- D. Three-fourth

- 8 Tone is the resistance of a muscle to ?**

Harrison's 18th Ed. 182

- A. Active stretch
- B. Passive stretch
- C. Gravitational stretch
- D. Anti-gravity stretch

Tone is the resistance of a muscle to passive stretch.

- 9 Increased muscle tone is found in ?**

Harrison's 18th Ed. 182

- A. Spasticity
- B. Rigidity
- C. Paratonia
- D. All of the above

- 10 Which of the following about 'Spasticity' is false ?**

Harrison's 18th Ed. 182

- A. Velocity-dependent
- B. Sudden release at maximum
- C. Affects antigravity muscles
- D. None of the above

Spasticity refers to an increase in tone associated with disease of upper motor neurons. Spasticity is velocity-dependent, has a sudden release after reaching a maximum and predominantly affects the antigravity muscles (upper-limb flexors and lower-limb extensors).

- 11 Which of the following about 'Rigidity' is false ?**

Harrison's 18th Ed. 182

- A. Present throughout range of motion
- B. Affects flexors & extensors equally
- C. Occurs with extrapyramidal disorders
- D. None of the above

Rigidity is increased tone that is present throughout the range of motion and affects flexors and extensors equally. Rigidity occurs with certain extrapyramidal disorders such as Parkinson's disease.

- 12 Which of the following about 'Paratonia' is false ?**

Harrison's 18th Ed. 182

- A. Also called gegenhalten
- B. Increased tone varies irregularly
- C. Present throughout range of motion
- D. None of the above

- 13 Which of the following about 'Paratonia' is false ?**

Harrison's 18th Ed. 182

- A. Increased muscle tone
- B. Affects flexors & extensors equally
- C. Results from disease of frontal lobes
- D. None of the above

Paratonia (gegenhalten) is increased tone that varies irregularly related to the degree of relaxation. It is present throughout the range of motion and affects flexors & extensors equally. Results from disease of frontal lobes.

14 Which of the following about 'flaccidity' is false ?*Harrison's 18th Ed. 182*

- A. Weakness
- B. Decreased tone
- C. Disorder of motor unit
- D. None of the above

Weakness with decreased tone is called flaccidity. It occurs with disorders of motor units which consists of a single lower motor neuron and all of the muscle fibers that are innervated by it.

15 Which of the following is false about fasciculation ?*Harrison's 18th Ed. 182*

- A. Visible twitch
- B. Palpable twitch
- C. Spontaneous discharge of a motor unit
- D. None of the above

Fasciculations are visible or palpable twitch within a muscle due to spontaneous discharge of a motor unit.

16 Which of the following is false about upper motor neuron weakness ?*Harrison's 18th Ed. 182*

- A. Proximal muscle groups affected more than distal
- B. Axial movements spared
- C. Affects ability to perform rapid repetitive movements
- D. Normal movement rhythmicity is maintained

In UMN lesions, distal muscle groups are affected more severely than proximal ones.

17 Upper motor neurons have their cell bodies in which layer of primary motor cortex ?*Harrison's 18th Ed. 183 Figure 22-1*

- A. Layer III
- B. Layer IV
- C. Layer V
- D. Layer VI

Cell bodies of UMN's is in layer V of primary motor cortex (precentral gyrus, or Brodmann's area 4) and in premotor & supplemental motor cortex (area 6).

18 What proportion of pyramidal axons do not decussate and remain ipsilateral ?*Harrison's 18th Ed. 183 Figure 22-1*

- A. 2 to 10 %
- B. 5 to 15 %
- C. 10 to 30 %
- D. 20 to 35 %

At cervicomedullary junction, most pyramidal axons decussate into contralateral cortico-spinal tract of lateral spinal cord, but 10 - 30% remain ipsilateral in anterior spinal cord.

19 Pyramidal axons innervate most densely which of the following lower motor neurons ?*Harrison's 18th Ed. 183 Figure 22-1*

- A. Of hand muscles
- B. Of foot muscles
- C. Of axial muscles
- D. Of face muscles

Pyramidal neurons innervate most densely the LMN's of hand muscles.

20 Descending ventromedial bulbospinal pathways include ?*Harrison's 18th Ed. 183 Figure 22-1*

- A. Tectospinal pathway
- B. Vestibulospinal pathway
- C. Reticulospinal pathway
- D. All of the above

Descending ventromedial bulbospinal pathways include tectospinal, vestibulospinal, and reticulospinal pathways. These pathways influence axial & proximal muscles and are involved in the maintenance of posture and integrated movements of the limbs and trunk.

21 All of the following are part of descending ventromedial bulbospinal pathways except ?*Harrison's 18th Ed. 183 Figure 22-1*

- A. Tectospinal pathway
- B. Vestibulospinal pathway
- C. Reticulospinal pathway
- D. Rubrospinal pathway

Descending ventrolateral bulbospinal pathways, which originate predominantly in red nucleus (rubrospinal pathway), facilitate distal limb muscles. Bulbospinal system is also called extrapyramidal upper motor neuron system.

22 Which of the following is false about lower motor neuron weakness ?*Harrison's 18th Ed. 182*

- A. Due to loss of α neurons
- B. Due to loss of γ motor neurons
- C. Absent tendon stretch reflex suggests involvement of spindle afferent fibers
- D. Fasciculations signify anterior horn cell disease

Loss of γ -motor neurons does not cause weakness but decreases muscle tone and attenuates the stretch reflexes elicited on examination.

23 Which of the following is false about motor neurons ?*Harrison's 18th Ed. 183 Figure 22-2*

- A. α motor neurons innervate extrafusal muscle fibers
- B. γ motor neurons innervate intrafusal muscle fibers
- C. α motor neuron receives direct excitatory input from corticomotoneurons & primary muscle spindle afferents
- D. α motor neurons receive direct excitation from Renshaw cell interneurons

α -motor neurons receive direct inhibition from Renshaw cell interneurons.

24 Which of the following is false about myopathic weakness ?*Harrison's 18th Ed. 182, Table 22-1*

- A. Due to disorders of muscle fibers
- B. Due to defect in neuromuscular junctions
- C. In EMG, size of each motor unit action potential is reduced
- D. Distribution of weakness is distal

Distribution of myopathic weakness is typically proximal. Lower motor neuron weakness is most profound distally.

25 "Pure motor" hemiparesis of the face, arm, or leg is due to a lesion in ?*Harrison's 18th Ed. 184*

- A. Posterior limb of internal capsule
- B. Cerebral peduncle
- C. Upper pons

D. Any of the above

"Pure motor" hemiparesis of face, arm, or leg is due to lesion in posterior limb of the internal capsule, cerebral peduncle or upper pons.

26 Paraparesis can arise due to ?

Harrison's 18th Ed. 184

- A. Anterior horn cell disorders
- B. Cauda equina syndrome
- C. Peripheral neuropathies
- D. Any of the above

27 Acute paraparesis can be due to which of the following diseases of cerebral hemispheres ?

Harrison's 18th Ed. 184

- A. Superior sagittal sinus thrombosis
- B. Cortical venous thrombosis
- C. Acute hydrocephalus
- D. Any of the above

28 Cerebral cortex of human brain contains approximately how many neurons ?

Harrison's 18th Ed. 202

- A. 5 billion
- B. 10 billion
- C. 20 billion
- D. 50 billion

29 Cerebral cortex of human brain has an area of ?

Harrison's 18th Ed. 202

- A. 0.5 m²
- B. 1.5 m²
- C. 2.5 m²
- D. 3.5 m²

Human cerebral cortex contains ~20 billion neurons spread over an area of 2.5 m².

30 Primary sensory & motor areas constitute what percentage of cerebral cortex ?

Harrison's 18th Ed. 202

- A. 10 %
- B. 15 %
- C. 20 %
- D. 25 %

Primary sensory & motor areas constitute 10% of the cerebral cortex.

31 A language disturbance occurring after a right hemisphere lesion in a right hander is called ?

Harrison's 18th Ed. 203

- A. Ipsilateral aphasia
- B. Sequence aphasia
- C. Crossed aphasia
- D. Retro aphasia

Language disturbance occurring after a right hemisphere lesion in a right hander is called crossed aphasia.

32 Anomia refers to ?

Harrison's 18th Ed. 203

- A. Naming with the wrong word

B. Deficit of naming

C. Naming a different object

D. Any of the above

Deficit of naming or anomia is the single most common finding in aphasic patients. Naming with the wrong word is called paraphasia.

33 Anomic aphasia is the single most common language disturbance seen in ?

Harrison's 18th Ed. 203

- A. Head trauma
- B. Metabolic encephalopathy
- C. Alzheimer's disease
- D. All of the above

Anomic aphasia is the single most common language disturbance seen in head trauma, metabolic encephalopathy, and Alzheimer's disease.

34 Inability to read aloud or comprehend single words and simple sentences is called ?

Harrison's 18th Ed. 203

- A. Alexia
- B. Agraphia
- C. Anomia
- D. Paraphasia

Alexia describes an inability to either read aloud or comprehend single words and simple sentences; agraphia (or dysgraphia) is used to describe an acquired deficit in the spelling or grammar of written language.

35 Which of the following is impaired in Wernicke's aphasia ?

Harrison's 18th Ed. 203 Table 26-1

- A. Comprehension
- B. Repetition of spoken language
- C. Naming
- D. All of the above

Comprehension, repetition of spoken language and naming are impaired in Wernicke's aphasia. Fluency is preserved or increased.

36 Which of the following is preserved in Broca's aphasia ?

Harrison's 18th Ed. 203 Table 26-1

- A. Comprehension
- B. Repetition of spoken language
- C. Naming
- D. Fluency

37 Fluency is severely impaired in ?

Harrison's 18th Ed. 205

- A. Aphemia
- B. Alexia
- C. Anomia
- D. Wernicke's aphasia

Aphemia is an acute onset of severely impaired fluency.

38 Apraxia refers to ?

Harrison's 18th Ed. 205

- A. Repetition of spoken language
- B. Disorder of initiating skilled / learned movement
- C. Impaired comprehension
- D. No purposeful speech

39 In apraxia, complex motor deficit is attributed to ?*Harrison's 18th Ed. 205*

- A. Pyramidal dysfunction
- B. Extrapyramidal dysfunction
- C. Cerebellar dysfunction
- D. None of the above

Apraxia refers to a complex motor deficit that cannot be attributed to pyramidal, extrapyramidal, cerebellar, or sensory dysfunction. It is a disorder of planning & initiating a skilled or learned movement unrelated to a significant motor or sensory deficit.

40 Gerstmann's Syndrome includes all except ?*Harrison's 18th Ed. 206*

- A. Acalculia
- B. Aphasia
- C. Right-left confusion
- D. Finger anomia

Gerstmann tetrad comprises of acalculia, alexia, finger anomia and right-left confusion. Pure Gerstmann syndrome is without aphasia.

41 In isolated Gerstmann's syndrome, the damage is in ?*Harrison's 18th Ed. 206*

- A. Superior parietal lobule in dominant hemisphere
- B. Inferior parietal lobule in dominant hemisphere
- C. Superior parietal lobule in non-dominant hemisphere
- D. Inferior parietal lobule in non-dominant hemisphere

Isolated Gerstmann's syndrome results from damage to inferior parietal lobule (angular gyrus) in the left hemisphere.

42 Paratonic rigidity or gegenhalten results from disease of ?*Harrison's 17th Ed. 147*

- A. Frontal lobes
- B. Temporal lobes
- C. Parietal lobes
- D. Occipital lobes

Paratonia (or gegenhalten) is increased tone that varies irregularly in a manner that may seem related to the degree of relaxation, is present throughout the range of motion, and affects flexors and extensors equally; it usually results from disease of the frontal lobes.

43 Statements uttered in a monotone are termed ?*Harrison's 18th Ed. 206*

- A. Primary progressive aphasia (PPA)
- B. Anomic aphasia
- C. Apraxia
- D. Prosopagnosia

44 Which symptom can occur in Bálint's syndrome ?*Harrison's 17th Ed. 168*

- A. Optic ataxia
- B. Oculomotor apaxia
- C. Simultagnosia
- D. All of the above

Bálint's syndrome is a state of severe spatial disorientation involving deficits in orderly visuomotor scanning of the environment (oculomotor apraxia) and in accurate manual reaching toward visual targets (optic ataxia) and simultanagnosia and reflects an inability to integrate visual information in the center of gaze with more peripheral information.

45 Bálint's syndrome may result from ?*Harrison's 17th Ed. 168*

- A. Hypoglycemia
- B. Sagittal sinus thrombosis
- C. Atypical forms of Alzheimer's disease
- D. All of the above

46 Face recognition deficit is termed as ?*Harrison's 18th Ed. 209*

- A. Primary progressive aphasia (PPA)
- B. Visual object agnosia
- C. Apraxia
- D. Prosopagnosia

Face & object recognition deficits are known as prosopagnosia & visual object agnosia. Lesions in prosopagnosia & visual object agnosia consist of bilateral infarctions in the territory of posterior cerebral arteries.

47 Cause of transient global amnesia is ?*Harrison's 18th Ed. 210*

- A. Migraine
- B. Temporal lobe seizures
- C. TIA in the posterior cerebral territory
- D. All of the above

48 What proportion of all human cerebral cortex is located in the frontal lobes ?*Harrison's 18th Ed. 210*

- A. One - fourth
- B. One - third
- C. One - half
- D. Three - fourth

~ One-third of all human cerebral cortex is located in the frontal lobes.

49 Characteristics of dystonia include all except ?*Harrison's 18th Ed. 193*

- A. Ill sustained muscle contractions
- B. Repetitive twisting movements
- C. Abnormal posture
- D. Often has a genetic basis

Dystonia is a disorder characterized by sustained muscle contractions, resulting in repetitive twisting movements and abnormal posture. It often has a genetic basis.

50 Freezing gait is a feature of ?*Harrison's 18th Ed. 193*

- A. Progressive supranuclear palsy
- B. Multiple system atrophy
- C. Corticobasal degeneration
- D. All of the above

Freezing gait is a feature of Parkinson's disease, progressive supranuclear palsy, multiple system atrophy, corticobasal degeneration, and primary pallidal degeneration.

51 Pill-rolling tremor is a characteristic feature of ?*Harrison's 18th Ed. 193*

- A. Progressive supranuclear palsy
- B. Multiple system atrophy
- C. Corticobasal degeneration
- D. Parkinson's disease

52 Term "gait apraxia" refers to ?

Harrison's 18th Ed. 193

- A. Cautious gait
- B. Cerebellar gait ataxia
- C. Frontal gait disorder
- D. Sensory ataxia

53 "Astasia-abasia" best relates to ?

Harrison's 18th Ed. 194

- A. Cautious gait
- B. Cerebellar gait ataxia
- C. Psychogenic gait disorder
- D. Sensory ataxia

Hysterical gait disorders with odd gyrations of posture & wastage of muscular energy (astasia-abasia), extreme slow motion & dramatic fluctuations over time are seen in somatoform disorders & conversion reaction.

54 Which of the following is not a positive sensory symptom ?

Harrison's 18th Ed. 186

- A. Tingling
- B. Numbness
- C. Burning
- D. Pricking

Loss of sensory function (diminished or absent feeling) is termed negative phenomena experienced as numbness and abnormal finding on sensory examination.

55 Hyperesthesia means pain or increased sensitivity in response to?

Harrison's 18th Ed. 186

- A. Touch
- B. Pain
- C. Warm or cold stimuli
- D. All of the above

Hyperesthesia means pain or increased sensitivity in response to touch.

56 Allodynia refers to ?

Harrison's 18th Ed. 186

- A. Pain on imagination
- B. Fear of pain
- C. Painful response to nonpainful stimulus
- D. Nonpainful response to painful stimulus

Painful response to nonpainful stimulus is termed allodynia. Like, elicitation of a painful sensation by application of a vibrating tuning fork.

57 Hyperpathia includes which of the following ?

Harrison's 18th Ed. 186

- A. Hyperesthesia
- B. Allodynia
- C. Hyperalgesia
- D. All of the above

Hyperpathia, a broad term, encompasses all the phenomena described by hyperesthesia, allodynia, and hyperalgesia. With hyperpathia, the threshold for a sensory stimulus is increased and perception is delayed, but once felt, is unduly painful.

58 Sense of vibration is tested with a tuning fork that vibrates at ?

Harrison's 18th Ed. 187

- A. 128 Hz

- B. 256 Hz
- C. 512 Hz
- D. Any of the above

Sense of vibration is tested with a tuning fork that vibrates at 128 Hz.

59 Cortical sensation are tested by ?

Harrison's 18th Ed. 188

- A. Two-point discrimination
- B. Bilateral simultaneous stimulation
- C. Graphesthesia
- D. All of the above

Commonly used tests of cortical function are two-point discrimination, touch localization, bilateral simultaneous stimulation & tests for graphesthesia and stereognosis.

60 Normal individuals can distinguish separation of points by what minimum distance in 2-PD test ?

Harrison's 18th Ed. 188

- A. 1 mm
- B. 3 mm
- C. 5 mm
- D. 7 mm

Normal individuals can distinguish separation of points by 3 mm distance in two-point discrimination test.

61 Which of the following is false about small-fiber polyneuropathy ?

Harrison's 18th Ed. 191

- A. Burning, painful dysesthesias
- B. Sparing of proprioception
- C. Sparing of motor function
- D. Absent tendon reflexes

62 Which of the following is false about large-fiber polyneuropathy ?

Harrison's 18th Ed. 191

- A. Vibration & position sense deficits
- B. Imbalance
- C. Absent tendon reflexes
- D. None of the above

Small-fiber polyneuropathies are characterized by burning, painful dysesthesias with reduced pinprick & thermal sensation but sparing of proprioception, motor function & deep tendon reflexes. Large-fiber polyneuropathies are characterized by vibration & position sense deficits, imbalance, absent tendon reflexes & variable motor dysfunction but preservation of most cutaneous sensation.

63 Which of the following is false about Brown-Séquard syndrome ?

Harrison's 18th Ed. 191

- A. Hemisection of the spinal cord
- B. Absent pain & temperature sensation contralaterally
- C. Loss of proprioceptive sensation & power ipsilaterally
- D. None of the above

Hemisection of spinal cord produces Brown-Séquard syndrome, with absent pain & temperature sensation contralaterally & loss of proprioceptive sensation & power ipsilaterally below the lesion.

64 Which of the following sensory loss occurs in syringomyelia ?

Harrison's 18th Ed. 191

- A. Pinprick & temperature
- B. Light touch
- C. Position sense

D. Vibration

In syringomyelia there is a dissociated sensory loss with impairment of pinprick & temperature appreciation. Light touch, position sense and vibration appreciation are preserved.

65 Which of the following is related to Lhermitte's sign ?

Harrison's 18th Ed. 191

- A. Flexion of the neck
- B. Electric shock like sensation
- C. Radiation down the back & into the legs
- D. All of the above

In Lhermitte's sign, flexion of neck leads to an electric shock like sensation that radiates down the back and into the legs. It is seen in patients with a cervical lesion affecting posterior columns like multiple sclerosis, cervical spondylosis or recent irradiation to the cervical region. Vitamin B₁₂ deficiency syndrome & Cisplatin toxicity can also cause it.

66 Pansensory loss contralaterally is produced by a lesion in ?

Harrison's 18th Ed. 191

- A. Cervical spinal cord
- B. Thalamus
- C. Tegmentum of pons & midbrain
- D. Lateral medulla

A lesion in tegmentum of pons & midbrain, where lemniscal & spinothalamic tracts merge, causes pansensory loss contralaterally.

67 The site of lesion in Déjerine-Roussy syndrome is in ?

Harrison's 18th Ed. 191

- A. Cervical spinal cord
- B. Thalamus
- C. Tegmentum of pons & midbrain
- D. Lateral medulla

Lesion affecting VPL nucleus of thalamus produces a syndrome of thalamic pain called Déjerine-Roussy syndrome.

68 Which of the following is labeled as the "Fifth vital sign" ?

Harrison's 17th Ed. 70

- A. Pain
- B. Skin hue
- C. Cooperation of patient
- D. Colour of nails

69 In adults, normal CSF volume is ?

Harrison's 17th Ed. A 11

- A. ~ 100 ml
- B. ~ 150 ml
- C. ~ 200 ml
- D. ~ 250 ml

70 Normal CSF pressure is ?

Harrison's 17th Ed. A 11

- A. 20 - 70 mm H₂O
- B. 80 - 120 mm H₂O
- C. 50 - 180 mm H₂O
- D. 120 - 280 mm H₂O

71 Normal CSF osmolality is ?

Harrison's 17th Ed. A 11

- A. 280 - 285 mOsm/L

B. 285 - 292 mOsm/L

C. 292 - 297 mOsm/L

D. 298 - 302 mOsm/L

72 Normal CSF pH is ?

Harrison's 17th Ed. A 11

- A. 7.31 - 7.34
- B. 7.34 - 7.37
- C. 7.37 - 7.40
- D. 7.40 - 7.44

73 Which receptor for PGE₂ in brain is essential for fever ?

Harrison's 18th Ed. 145

- A. EP-1
- B. EP-2
- C. EP-3
- D. EP-4

Elevation of PGE₂ in brain starts the process of raising hypothalamic set point for core temperature. Out of the 4 receptors for PGE₂, EP-3 is essential for fever.

74 Which of the following statements is false about Type I muscle fibers ?

Harrison's 16th Ed. 134

- A. Rich in mitochondria
- B. Poor in oxidative enzymes
- C. Have low energy demands
- D. Produce relatively low force

75 Which of the following statements is false about Type II muscle fibers ?

Harrison's 16th Ed. 134

- A. Rich in glycolytic enzymes
- B. Produce relatively high force
- C. Have high energy demands
- D. None of the above

Headache

76 Which cranial structure is pain-insensitive ?

Harrison's 18th Ed. 112

- A. Scalp
- B. Choroid plexus
- C. Dural sinuses
- D. Falx cerebri

77 Which cranial structure is pain-sensitive ?

Harrison's 18th Ed. 112

- A. Ventricular ependyma
- B. Choroid plexus
- C. Pial veins
- D. Falx cerebri

Pain-producing cranial structures include scalp, middle meningeal artery, dural sinuses, falx cerebri and proximal segments of large pial arteries. Ventricular ependyma, choroid plexus, pial veins, and much of the brain parenchyma are not pain-producing.

78 Which of the following is a type of primary headache ?

Harrison's 18th Ed. 112 Table 14-1

- A. Migraine
- B. Tension-type
- C. Cluster
- D. All of the above

79 Which of the following is not a type of primary headache ?

Harrison's 18th Ed. 112 Table 14-1

- A. Idiopathic stabbing
- B. Exertional
- C. Systemic infection
- D. Tension-type

Primary headaches are those in which headache and its associated features are the disorder in itself, whereas secondary headaches are those caused by exogenous disorders. Examples of primary headache are migraine, tension-type, cluster, idiopathic stabbing & exertional. Examples of secondary headache are systemic infection, head injury, vascular disorders, subarachnoid hemorrhage & brain tumor.

80 Of the following cause of primary headache, which one is the most common ?

Harrison's 18th Ed. 112 Table 14-1

- A. Migraine
- B. Tension-type
- C. Cluster
- D. Exertional

Relative frequency of various types of primary headache is migraine 16%, tension-type 69%, cluster 0.1%, idiopathic stabbing 2% and exertional 1%.

81 Of the following cause of secondary headache, which one is the most common ?

Harrison's 18th Ed. 112 Table 14-1

- A. Systemic infection
- B. Vascular disorders
- C. Subarachnoid hemorrhage
- D. Brain tumor

Relative frequency of various types of secondary headache is systemic infection 63%, head injury 4%, vascular disorders 1%, subarachnoid hemorrhage <1% and brain tumor 0.1%.

82 Which of the following is not a vascular headache ?

Harrison's 18th Ed. 113

- A. Migraine
- B. Cluster headache
- C. Tension-type headache
- D. None of the above

Migraine & other primary headache types are not vascular headaches.

83 Vomiting that precedes the appearance of headache by weeks is highly characteristic of ?

Harrison's 18th Ed. 113

- A. Meningitis
- B. Subarachnoid hemorrhage
- C. Posterior fossa brain tumors
- D. Temporal arteritis

Vomiting that precedes appearance of headache by weeks is highly characteristic of posterior fossa brain tumors.

84 Migraine activators include all except ?

Harrison's 17th Ed. 96

- A. Red wine
- B. Menstruation
- C. Pregnancy
- D. Lack of sleep

85 Migraine deactivators include all except ?

Harrison's 17th Ed. 96

- A. Sleep
- B. Pregnancy
- C. Exhilaration
- D. Hunger

Activators of migraine are referred to as triggers. These include glare, bright lights, sounds, or other afferent stimulation; hunger, excess stress, physical exertion, stormy weather or barometric pressure changes, hormonal fluctuations during menses, lack of or excess sleep & alcohol or other chemical stimulation.

86 Triptans are least potent agonist of ?

Harrison's 18th Ed. 115

- A. 5-HT_{1A} receptor
- B. 5-HT_{1B} receptor
- C. 5-HT_{1D} receptor
- D. 5-HT_{1F} receptor

Triptans are potent agonists of 5-HT_{1B}, 5-HT_{1D}, and 5-HT_{1F} receptors and are less potent at the 5-HT_{1A} receptor.

87 Antimigraine efficacy of the triptans is due to their ability to stimulate ?

Harrison's 18th Ed. 115

- A. 5-HT_{1A} receptors
- B. 5-HT_{1B} receptors
- C. 5-HT_{1C} receptors
- D. 5-HT_{1E} receptors

Antimigraine efficacy of triptans relates to their ability to stimulate 5-HT_{1B/1D} receptors, which are located on both blood vessels and nerve terminals.

88 Which of the following gene has been incriminated in the causation of migraine ?

Harrison's 16th Ed. 89

- A. tRNA^{Leu(UUR)}
- B. CACNL 1A4
- C. DRD2
- D. All of the above

89 Which of the following gene has been incriminated in the causation of Familial hemiplegic migraine (FHM) ?

Harrison's 18th Ed. 115

- A. tRNA^{Leu(UUR)}
- B. CACNA1A
- C. DRD2
- D. All of the above

Mutations involving the Ca_v2.1 (P/Q) type voltage-gated calcium channel CACNA1A gene cause familial hemiplegic migraine 1 (FHM 1). Mutations in Na⁺-K⁺ATPase ATP1A2 gene causes FHM 2. Mutations in neuronal voltage-gated sodium channel SCN1A cause FHM 3.

90 In acephalgic migraine, which of the following is least prominent?*Harrison's 18th Ed. 116*

- A. Recurrent neurologic symptoms
- B. Nausea or vomiting
- C. Headache
- D. Vertigo

Patients with acephalgic migraine have recurrent neurologic symptoms, with nausea or vomiting, but with little or no headache. Vertigo may be prominent.

91 MIDAS stands for ?*Harrison's 18th Ed. 116*

- A. Migraine Disease Assessment Score
- B. Migraine Disability Assessment Score
- C. Migraine Drug Assessment Score
- D. Migraine Diagnosis Assessment Score

MIDAS stands for Migraine Disability Assessment Score meant to assess the extent of a patient's disease and disability.

92 Drugs effective in treatment of migraine are ?*Harrison's 18th Ed. 119*

- A. Anti-inflammatory agents
- B. 5HT_{1B/1D} receptor agonists
- C. Dopamine receptor antagonists
- D. All of the above

Drugs effective in the treatment of migraine are anti-inflammatory agents, 5HT_{1B/1D} receptor agonists and dopamine receptor antagonists.

93 Electrical stimulation of which part of brain results in migraine-like headache ?*Harrison's 18th Ed. 115 Figure 14-1*

- A. Temporal lobe
- B. Midbrain in the region of dorsal raphe
- C. Putamen
- D. Globus pallidum

94 Headaches that build up over hours, maintained for several hours to days, relieved by sleep are suggestive of ?*Harrison's 16th Ed. 86*

- A. Migraine
- B. Cluster headache
- C. Brain tumors
- D. Unruptured aneurysms

95 Chronic head-pain syndrome best relates to ?*Harrison's 18th Ed. 120*

- A. Migraine
- B. Tension-type headache (TTH)
- C. Cluster headache
- D. All of the above

Term tension-type headache (TTH) is commonly used to describe a chronic head-pain syndrome characterized by bilateral tight, bandlike discomfort.

96 Which of the following is an accompanying feature of tension-type headache ?*Harrison's 18th Ed. 120*

- A. Nausea, vomiting

- B. Photophobia, phonophobia
- C. Aggravation with movement
- D. None of the above

TTH patients have headaches without accompanying features like nausea, vomiting, photophobia, phonophobia, osmophobia, throbbing & aggravation with movement.

97 For chronic TTH, which is the only proven treatment ?*Harrison's 18th Ed. 122*

- A. Amitriptyline
- B. Selective serotonin reuptake inhibitors
- C. Benzodiazepines
- D. Acupuncture

For chronic TTH, amitriptyline is the only proven treatment.

98 Trigeminal autonomic cephalalgias include all except ?*Harrison's 18th Ed. 122*

- A. Cluster headache
- B. Migraine
- C. Paroxysmal hemicrania
- D. SUNCT

Trigeminal autonomic cephalalgias (TACs) includes cluster headache, paroxysmal hemicrania & SUNCT (short-lasting unilateral neuralgiform headache attacks with conjunctival injection & tearing). TAC features are short-lasting attacks of head pain with cranial autonomic symptoms (lacrimation, conjunctival injection, or nasal congestion).

99 Short-lasting headaches without prominent cranial autonomic syndromes include ?*Harrison's 18th Ed. 122*

- A. Trigeminal neuralgia
- B. Primary stabbing headache
- C. Hypnic headache
- D. All of the above

Short-lasting headaches without prominent cranial autonomic syndromes are trigeminal neuralgia, primary stabbing headache & hypnic headache.

100 Which of the following is false about cluster headache ?*Harrison's 18th Ed. 122*

- A. Men are affected more than women
- B. Ipsilateral autonomic features
- C. Propranolol and amitriptyline are ineffective
- D. Lithium is not beneficial

101 Which of the following is false about cluster headache ?*Harrison's 18th Ed. 122*

- A. Pain is strictly unilateral
- B. Pain affects the same side in subsequent episodes
- C. Certain foods or emotional factors precipitate pain
- D. On-off vulnerability to alcohol

102 Which of the following is false about cluster headache ?*Lancet 2005; 366: 843-55*

- A. Circadian rhythmicity of painful attacks
- B. Autonomic symptoms
- C. Severe unilateral pain
- D. Hypothalamic dysfunction has no role in acute attacks

103 Which of the following is most useful during acute attack of cluster headache ?

Lancet 2005; 366: 843-55

- A. 100% oxygen inhalation
- B. Valsalva manuevre
- C. Hyperventilation
- D. All of the above

104 Which of the following is a feature of cluster headache ?

Harrison's 18th Ed. 122

- A. Periodicity
- B. Unilateral pain
- C. A pain-free interval
- D. All of the above

105 Drugs used for preventive treatment of cluster headache include all except ?

Harrison's 18th Ed. 122

- A. Prednisone
- B. Lithium
- C. Cyproheptadine
- D. Methysergide

Oral glucocorticoids, methysergide, lithium are useful for chronic form of cluster headache.

106 Which of the following is a feature of paroxysmal hemicrania ?

Harrison's 18th Ed. 124

- A. Very frequent short-lasting attacks
- B. Equal male : female ratio
- C. Excellent response to indomethacin
- D. All of the above

107 Which of the following is a feature of SUNCT ?

Harrison's 18th Ed. 124

- A. Ipsilateral conjunctival injection and lacrimation
- B. Lack of refractory period to triggering
- C. Lack of a response to indomethacin
- D. All of the above

108 Secondary SUNCT is seen in ?

Harrison's 18th Ed. 124

- A. Anterior communicating artery aneurysm
- B. Post head injury
- C. Posterior fossa or pituitary lesions
- D. Hypertension

SUNCT (short-lasting unilateral neuralgiform headache attacks with conjunctival injection and tearing) can be seen with posterior fossa or pituitary lesions.

109 Most effective treatment for prevention of SUNCT is ?

Harrison's 18th Ed. 124

- A. Prednisone
- B. Lamotrigine
- C. Cyproheptadine
- D. Lithium

Most effective treatment for prevention of SUNCT is lamotrigine. Topiramate, gabapentin and carbamazepine offer modest benefit.

110 Chronic daily headache (CDH) means headache for how many days per month ?

Harrison's 18th Ed. 124

- A. 3 days per month
- B. 7 days per month
- C. 10 days per month
- D. 15 days per month

111 Which of the following is a feature of new daily persistent headache (NDPH) ?

Harrison's 18th Ed. 125

- A. Headache on most if not all days
- B. Ipsilateral conjunctival injection and lacrimation
- C. Very frequent short-lasting attacks
- D. Periodicity

112 Which of the following is false about lumbar puncture headache ?

Harrison's 18th Ed. 125

- A. Usually begins within 48 hours
- B. Incidence is between 10 and 30 %
- C. Is dramatically positional
- D. Aggravated by abdominal compression

113 Which of the following is false about lumbar puncture headache ?

Harrison's 18th Ed. 125

- A. Worsened by head shaking
- B. Worsened by jugular vein compression
- C. Location is bitemporal
- D. Epidural blood patch is effective treatment

114 Which of the following is not a feature of lumbar puncture headache ?

Harrison's 18th Ed. 125

- A. Dramatically positional
- B. Begins when the patient sits or stands upright
- C. Relief by abdominal compression
- D. Relief by jugular vein compression

Low CSF volume headache is positional (recumbency improves headache within minutes), occipitofrontal, begins within 48 hours following lumbar puncture (incidence 10-30%) & caffeine, abdominal binder & oral theophylline provide temporary relief. Symptoms result from low CSF volume rather than low CSF pressure.

115 Headache on rising in the morning or nocturnal headache is characteristic of ?

Harrison's 18th Ed. 126

- A. Obstructive sleep apnea
- B. Poorly controlled hypertension
- C. Raised CSF pressure headache
- D. All of the above

116 Sleep disruption and early morning headaches that improve during the day are characteristics of ?

Harrison's 18th Ed. 114

- A. Migraine
- B. Cluster headache
- C. Brain tumors
- D. Unruptured aneurysms

117 "Fortification spectrum" is characteristic of ?

Harrison's 16th Ed. 90

- A. Cluster headache
- B. Migraine
- C. Pseudotumour cerebri
- D. Giant cell arteritis

118 Which of the following is false about Bickerstaff's migraine ?

Harrison's 16th Ed. 90

- A. Episodes begin with total blindness
- B. Symptoms (vertigo, ataxia) persist for 20 - 30 minutes
- C. Occurs only in males
- D. Full recovery after the episode is the rule

119 Methysergide may cause retroperitoneal or cardiac valvular fibrosis when used for more than ?

Harrison's 18th Ed. 120

- A. 3 months
- B. 6 months
- C. 9 months
- D. 12 months

Methysergide may cause retroperitoneal or cardiac valvular fibrosis when it is used for > 6 months. Risk of fibrosis is about 1:1500 and is likely to reverse after drug is stopped.

120 Lower-half headache or facial migraine called ?

Harrison's 16th Ed. 90

- A. Basilar migraine
- B. Carotidynia
- C. Raeder's syndrome
- D. Ophthalmoplegic migraine

121 Common precipitant of carotidynia attacks is ?

Harrison's 16th Ed. 91

- A. Cervical spondylosis
- B. Dental trauma
- C. Hypertension
- D. All of the above

122 Out of the following, which is the commonest symptom accompanying severe migraine ?

Harrison's 16th Ed. 90

- A. Photophobia
- B. Scalp tenderness
- C. Vomiting
- D. Vertigo

123 For instituting prophylactic treatment of migraine, what should be the frequency of attacks ?

Harrison's 16th Ed. 93

- A. At least three attacks per day
- B. At least three attacks per week
- C. At least three attacks per month
- D. At least three attacks per year

124 Drugs used for prophylactic treatment of migraine include all except ?

Harrison's 18th Ed. 120

- A. Timolol
- B. Sodium valproate
- C. Methysergide
- D. Sumatriptan

125 Drugs used for prophylactic treatment of migraine include all except ?

Harrison's 18th Ed. 120

- A. Amitriptyline
- B. Verapamil
- C. Metoclopramide
- D. Cyproheptadine

126 Which of the following drugs for treatment of acute migraine can be administered by nasal route ?

Harrison's 18th Ed. 118 Table 14-5

- A. Dihydroergotamine
- B. Sumatriptan
- C. Zolmitriptan
- D. All of the above

Chapter 274. Coma

127 At bedside, which of the following terms is not ambiguous and is preferred ?

Harrison's 18th Ed. 2247

- A. Lethargy
- B. Drowsiness
- C. Semicoma
- D. Obtundation

At bedside, stupor, drowsiness and coma are precise narrative descriptions of the level of arousal and of the type of responses evoked by various stimuli and are preferable to ambiguous terms such as lethargy, semicoma, or obtundation.

128 Akinetic mutism results from damage in ?

Harrison's 18th Ed. 2247

- A. Ventral pons
- B. Medial thalamic nuclei
- C. Temporal lobe
- D. Any of the above

Akinetic mutism results from damage in regions of medial thalamic nuclei or frontal lobes (particularly orbitofrontal surfaces) or from extreme hydrocephalus.

129 Abulia describes a milder form of ?

Harrison's 18th Ed. 2247

- A. Parkinsonism
- B. Akinetic mutism
- C. Catatonia
- D. Locked-in state

Abulia is a milder form of akinetic mutism characterized by mental & physical slowness with diminished ability to initiate activity. It is usually the result of damage to frontal lobes and its connections.

130 Which of the following occurs as part of a major psychosis ?

Harrison's 18th Ed. 2247

- A. Akinetic mutism

- B. Abulia
- C. Catatonia
- D. Locked-in state

Catatonia occurs as part of a major psychosis (schizophrenia or major depression).

131 Catatonia is differentiated from akinetic mutism by ?

Harrison's 18th Ed. 2247

- A. Level of awakening
- B. Babinski signs
- C. Blinking
- D. Mobility

Catatonia is differentiated from akinetic mutism by clinical evidence of cerebral damage such as Babinski signs and hypertonicity of the limbs present in akinetic mutism.

132 "Waxy flexibility" is a feature of which of the following ?

Harrison's 18th Ed. 2247

- A. Abulia
- B. Akinetic mutism
- C. Catatonia
- D. Locked-in state

In catatonia, the patient retains the posture in which they have been placed by the examiner ("waxy flexibility," or catalepsy).

133 "Locked-in state" results from damage in ?

Harrison's 18th Ed. 2247

- A. Ventral pons
- B. Medial thalamic nuclei
- C. Temporal lobe
- D. Any of the above

"Locked-in state" results from an infarction or hemorrhage of ventral pons that transects all descending motor (corticospinal and corticobulbar) pathways.

134 "Locked-in state" like condition may be seen in ?

Harrison's 18th Ed. 2247

- A. Guillain-Barré syndrome
- B. Critical illness neuropathy
- C. Pharmacologic neuromuscular blockade
- D. Any of the above

135 Coma results due to damage in reticular activating system (RAS) at the level of ?

Harrison's 18th Ed. 2247

- A. Medulla oblongata
- B. Pons
- C. Lower midbrain
- D. Upper midbrain

Coma results due to damage in reticular activating system (RAS) at the level of upper midbrain or its projections.

136 Metabolic derangement that can lead to suppression of reticulocerebral function is ?

Harrison's 18th Ed. 2247

- A. Hypoglycemia
- B. Uremia
- C. Hepatic failure

- D. All of the above

Metabolic derangements that can lead to suppression of reticulocerebral function are hypoglycemia, anoxia, uremia, and hepatic failure.

137 Which of the following finding suggests that the lesion is in the upper brainstem ?

Harrison's 18th Ed. 2247

- A. Pupillary enlargement
- B. Loss of light reaction
- C. Loss of vertical & adduction movements of eyes
- D. All of the above

Pupillary enlargement with loss of light reaction and loss of vertical and adduction movements of the eyes suggests that the lesion is in the upper brainstem. On the other hand, if pupillary light reaction and eye movements are intact, the lesion is more widespread or the cause of coma is metabolic suppression of the cerebral hemispheres.

138 The term 'coma dépassé' means ?

N Engl J Med 2001;344:1215

- A. Hysteria
- B. Irreversible coma
- C. Coma during pregnancy
- D. Coma in children

In 1959, Mollaret & Goulon introduced the term coma dépassé (irreversible coma) in 23 comatose patients who lost consciousness, brainstem reflexes & respiration & whose EEGs were flat.

139 As brain death occurs, which is the last part of brain to cease to function ?

N Engl J Med 2001;344:1216

- A. Cerebral cortex
- B. Midbrain
- C. Pons
- D. Medulla oblongata

As brain death occurs, patients lose their reflexes in a rostral-to-caudal direction, and medulla oblongata is the last part of brain to cease to function.

140 Misdiagnosis of brain death is possible in ?

N Engl J Med 2001;344:1215

- A. Locked-in syndrome
- B. Hypothermia
- C. Drug intoxication
- D. All of the above

Misdiagnosis of brain death is possible in locked-in syndrome, hypothermia or drug intoxication.

141 In the tests to confirm brain death, "hollow-skull sign" is a finding in which of the following ?

N Engl J Med 2001;344:1215

- A. EEG
- B. Dynamic radionuclide brain scan
- C. Cerebral angiography
- D. Transcranial Doppler measurements

When brain death has occurred, a dynamic radionuclide brain scan shows no intracranial filling - the so called hollow-skull sign.

142 Which part of brain is damaged in "locked-in syndrome" ?

N Engl J Med 2001;344:1215

- A. Medulla oblongata
- B. Pons

- C. Midbrain
- D. Thalamus

The locked-in syndrome (pseudocoma) is a consequence of destruction of base of pons mostly caused by acute embolus to basilar artery. Patient cannot move limbs, grimace, or swallow (damaged corticospinal & corticobulbar tracts), but upper rostral mesencephalic structures involved in voluntary blinking and vertical eye movements remain intact. Consciousness persists because tegmentum, with the reticular formation, is not affected.

143 The principal cause of coma is ?

- Harrison's 16th Ed. 1625
- A. Lesions that damage substantial portion of RAS
- B. Destruction of large portions of both cerebral hemispheres
- C. Suppression of thalamocerebral function by drugs, toxins, hypoglycemia, anoxia, azotemia, or hepatic failure
- D. All of the above

Principal causes of coma are lesions that damage the reticular activating system (RAS) or its projections, destruction of large portions of both cerebral hemispheres and suppression of reticulo-cerebral function by drugs, toxins, or metabolic derangements such as hypoglycemia, anoxia, azotemia, or hepatic failure.

144 Kernohan-Woltman sign best relates to ?

- Harrison's 18th Ed. 2248
- A. Hypoglycemia
- B. Central fever
- C. Transtentorial herniation
- D. Epileptic Coma

Transtentorial herniation refers to part of brain being displaced from supratentorial to infratentorial compartment through the tentorial opening. Consequent lateral displacement of midbrain may compress the opposite cerebral peduncle thus eliciting Kernohan-Woltman sign.

145 Kernohan-Woltman sign refers to ?

- Harrison's 18th Ed. 2248
- A. Contralesional pupillary dilatation in brain mass lesion
- B. Waxing and waning levels of consciousness
- C. Hemiparesis contralateral to original hemiparesis
- D. Bilateral nystagmus

Kernohan-Woltman sign refers to a Babinski response and hemiparesis contralateral to the original hemiparesis due to compression of the opposite cerebral peduncle.

146 Brain herniation can be ?

- Harrison's 18th Ed. 2248
- A. Transfalcial
- B. Transtentorial
- C. Foraminal
- D. All of the above

Various forms of brain herniations are transtentorial (temporal & central), transfalcial, foraminal.

147 Cingulate gyrus is likely to be involved in which of the following brain herniations ?

- Harrison's 18th Ed. 2248
- A. Temporal transtentorial herniation
- B. Central transtentorial herniation
- C. Transfalcial herniation
- D. Foraminal herniation

In transfalcial herniation, the cingulate gyrus is displaced under the falx and across the midline.

148 Cerebellar tonsils are likely to be involved in which of the following brain herniations ?

- Harrison's 18th Ed. 2248
- A. Temporal transtentorial herniation
- B. Central transtentorial herniation
- C. Transfalcial herniation
- D. Foraminal herniation

In foraminal herniation, cerebellar tonsils move downward into foramen magnum, causing compression of medulla that may result in respiratory arrest and death.

149 Drowsiness occurs when horizontal displacement of the pineal calcification occurs by ?

- Harrison's 18th Ed. 2248
- A. 1 to 3 mm
- B. 3 to 5 mm
- C. 6 to 8 mm
- D. > 9 mm

150 Stupor occurs when horizontal displacement of the pineal calcification occurs by ?

- Harrison's 18th Ed. 2248
- A. 1 to 3 mm
- B. 3 to 5 mm
- C. 6 to 8 mm
- D. > 9 mm

151 Coma occurs when horizontal displacement of the pineal calcification occurs by ?

- Harrison's 18th Ed. 2248
- A. 1 to 3 mm
- B. 3 to 5 mm
- C. 6 to 8 mm
- D. > 9 mm

On CT/MRI, horizontal displacement of pineal calcification of 3 to 5 mm is associated with drowsiness, 6 to 8 mm with stupor, and >9 mm with coma, in acutely appearing masses.

152 Cerebral blood flow is principally influenced by all except ?

- Harrison's 16th Ed. 1632
- A. Systemic blood pressure
- B. pH
- C. PCO₂
- D. PO₂

CBF is strongly influenced by systemic blood pressure, pH and PCO₂. CBF increases with hypercapnia and acidosis and decreases with hypocapnia and alkalosis.

153 Volume of CSF within ventricles and surrounding the brain and spinal cord is about ?

- Harrison's 16th Ed. 1632
- A. 50 mL
- B. 100 mL
- C. 150 mL
- D. 200 mL

154 Cerebral blood volume is about ?

- Harrison's 16th Ed. 1632
- A. 50 mL
- B. 100 mL
- C. 150 mL

D. 200 mL

About 150 mL of CSF is present within the ventricles and surrounding the brain and spinal cord. Cerebral blood volume is also ~150 mL.

- 155

Cerebral blood flow (CBF) in gray matter is about ?
Harrison's 18th Ed. 2248
A. 25 mL per 100 g/min
B. 50 mL per 100 g/min
C. 75 mL per 100 g/min
D. 100 mL per 100 g/min
- 156

Cerebral blood flow (CBF) in white matter is about ?
Harrison's 18th Ed. 2248
A. 10 mL per 100 g/min
B. 20 mL per 100 g/min
C. 30 mL per 100 g/min
D. 40 mL per 100 g/min
- 157

Mean cerebral blood flow (CBF) is about ?
Harrison's 18th Ed. 2248
A. 25 mL per 100 g/min
B. 35 mL per 100 g/min
C. 45 mL per 100 g/min
D. 55 mL per 100 g/min
- 158

Oxygen consumption of brain tissue is ?
Harrison's 18th Ed. 2248
A. 1.5 mL per 100 g/min
B. 2.5 mL per 100 g/min
C. 3.5 mL per 100 g/min
D. 4.5 mL per 100 g/min
- 159

Glucose utilization of brain tissue is ?
Harrison's 18th Ed. 2248
A. 1 mg per 100 g/min
B. 3 mg per 100 g/min
C. 5 mg per 100 g/min
D. 7 mg per 100 g/min
- 160

After the cessation of blood flow, brain stores of glucose provide energy for approximately ?
Harrison's 18th Ed. 2249
A. 1 min
B. 2 min
C. 3 min
D. 4 min
- 161

After the cessation of cerebral blood flow, oxygen stores last for approximately ?
Harrison's 18th Ed. 2249
A. 3 to 5 seconds
B. 8 to 10 seconds
C. 12 to 15 seconds
D. 20 to 30 seconds

Cerebral neurons are fully dependent on cerebral blood flow (CBF) and the related delivery of oxygen and glucose. CBF approximates 75 mL per 100 gram/minute in gray matter and 30 mL per

100 gram/minute in white matter (mean of 55 mL per 100 gram/minute). Oxygen consumption is 3.5 mL per 100 gram/minute, and glucose utilization is 5 mg per 100 gram/minute. Brain stores of glucose provide energy for ~2 minutes after blood flow is interrupted, and oxygen stores last 8 to 10 seconds after cessation of blood flow.

- 162

Sodium levels below how much is associated with coma and convulsions ?
Harrison's 18th Ed. 2249
A. 125 mmol/L
B. 120 mmol/L
C. 118 mmol/L
D. 115 mmol/L

Sodium levels <125 mmol/L induce confusion & <115 mmol/L are associated with coma & convulsions.

- 163

In hyperosmolar coma, the serum osmolality is generally more than ?
Harrison's 18th Ed. 2249
A. >280 mosmol/L
B. >300 mosmol/L
C. >320 mosmol/L
D. >350 mosmol/L

In hyperosmolar coma, the serum osmolality is generally >350 mosmol/L.

- 164

Disorder that occlude small blood vessels throughout the brain causing bihemispherical damage is ?
Harrison's 18th Ed. 2249
A. Cerebral malaria
B. Thrombotic thrombocytopenic purpura
C. Hyperviscosity
D. All of the above

Disorders that occlude small blood vessels throughout the brain causing bihemispherical damage are cerebral malaria, thrombotic thrombocytopenic purpura, and hyperviscosity.

- 165

Hypothermia itself causes coma only when the temperature is ?
Harrison's 18th Ed. 2249
A. < 34°C
B. < 33°C
C. < 32°C
D. < 31°C

Hypothermia itself causes coma only when the temperature is <31°C (87.8°F).

- 166

Cushing response best relates to ?
Harrison's 18th Ed. 2249
A. Hypertension
B. Cyanosis
C. Convulsion
D. Hypothermia

Cushing response refers to marked hypertension in a case of coma that may be secondary to a rapid rise in intracranial pressure (ICP), most often after cerebral hemorrhage or head injury.

- 167

Hypotension is characteristic of coma due to ?
Harrison's 18th Ed. 2249
A. Profound hypothyroidism
B. Sepsis
C. Alcohol intoxication

D. All of the above

Hypotension is characteristic of coma from alcohol or barbiturate intoxication, internal hemorrhage, myocardial infarction, sepsis, profound hypothyroidism, or Addisonian crisis.

168

On fundoscopic examination, subhyaloid hemorrhage suggests ?

Harrison's 18th Ed. 2249

A. Meningococcemia

B. Subarachnoid hemorrhage

C. Bleeding diathesis

D. All of the above

Subhyaloid hemorrhages on fundoscopic examination indicate subarachnoid hemorrhage.

169

Multifocal myoclonus indicates which of the following ?

Harrison's 18th Ed. 2250

A. Uremia

B. Haloperidol intoxication

C. Prion disease

D. Any of the above

Multifocal myoclonus almost always indicates a metabolic disorder (uremia, anoxia), drug intoxication (lithium or haloperidol), or a prion disease.

170

In a drowsy & confused patient, bilateral asterix is a certain sign of ?

Harrison's 18th Ed. 2250

A. Drug intoxication

B. Cerebral malaria

C. Septicemia

D. Head injury

In a drowsy and confused patient, bilateral asterix is a certain sign of metabolic encephalopathy or drug intoxication.

171

Bilateral damage rostral to the midbrain produces which of the following ?

Harrison's 18th Ed. 2250

A. Extension of elbows & wrists with pronation of arm

B. Flexion of elbows & wrists with supination of arm

C. Arm extension with leg flexion

D. Arm extension with flaccid legs

172

Bilateral damage to motor tracts in midbrain or caudal diencephalon produces which of the following ?

Harrison's 18th Ed. 2250

A. Extension of elbows & wrists with pronation of arm

B. Flexion of elbows & wrists with supination of arm

C. Arm extension with leg flexion

D. Arm extension with flaccid legs

Flexion of elbows and wrists and supination of arm (decortication) suggests bilateral damage rostral to the midbrain, whereas extension of elbows and wrists with pronation (decerebration) indicates damage to motor tracts in midbrain or caudal diencephalon.

173

Combination of arm extension with leg flexion or flaccid legs is associated with lesions in ?

Harrison's 18th Ed. 2250

A. Basal ganglia

B. Midbrain

C. Pons

D. Medulla oblongata

Combination of arm extension with leg flexion or flaccid legs is associated with lesions in pons.

174

Which of the following is not a brainstem reflex ?

Harrison's 18th Ed. 2250

A. Pupillary responses to light

B. Spontaneous and elicited eye movements

C. Corneal responses

D. Jaw jerk

Brainstem reflexes include pupillary responses to light, spontaneous and elicited eye movements, corneal responses, and respiratory pattern. As a rule, if these brainstem activities, particularly pupillary reactions and eye movements, are preserved, coma is due to bilateral hemispherical disease.

175

Normally reactive & round pupils of midsize excludes ?

Harrison's 18th Ed. 2250

A. Midbrain damage

B. Pontine damage

C. Temporal lobe damage

D. Occipital lobe damage

In coma, normally reactive & round pupils of midsize (2.5 - 5 mm) essentially excludes midbrain damage, either primary or secondary to compression.

176

Reaction to light is difficult to appreciate in pupils ?

Harrison's 18th Ed. 2250

A. < 2 mm in diameter

B. < 3 mm in diameter

C. < 4 mm in diameter

D. < 5 mm in diameter

Reaction to light is often difficult to appreciate in pupils <2 mm in diameter.

177

A transitional sign that accompanies early midbrain–third nerve compression is ?

Harrison's 18th Ed. 2250

A. Pupil > 6 mm is diameter

B. Oval & slightly eccentric pupil

C. Unilateral miosis

D. Reactive and bilaterally small

In coma, an oval & slightly eccentric pupil is a transitional sign that accompanies early midbrain–third nerve compression.

178

Bilaterally dilated & unreactive pupils indicate ?

Harrison's 18th Ed. 2250

A. Severe cortical damage

B. Severe thalamic damage

C. Severe midbrain damage

D. Severe pontine damage

In coma, bilaterally dilated & unreactive pupils, indicates severe midbrain damage, usually from compression by a supratentorial mass.

179

Pupils are smaller in size in which of the following ?

Harrison's 18th Ed. 2251

A. Metabolic encephalopathies

B. Hydrocephalus

C. Thalamic hemorrhage

D. All of the above

180 Pupils are smaller in size in which of the following ?

Harrison's 18th Ed. 2251

- A. Narcotic overdose
- B. Barbiturate overdose
- C. Pontine hemorrhage
- D. All of the above

181 Eyes turn down & inward with which of the following lesion ?

Harrison's 18th Ed. 2251

- A. Frontal lobe lesions
- B. Thalamic lesions
- C. Pontine lesions
- D. Medullary lesions

Eyes turn down & inward with thalamic hemorrhage & upper midbrain lesions.

182 Which of the following statements about eyes in a state of coma is correct ?

Harrison's 18th Ed. 2251

- A. Eyes look toward hemispherical lesion & away from brainstem lesion
- B. Eyes look away from hemispherical lesion & toward a brainstem lesion
- C. Eyes look away from hemispherical or a brainstem lesion
- D. Eyes look towards hemispherical or a brainstem lesion

Conjugate horizontal ocular deviation to one side indicates damage to pons on the opposite side or to frontal lobe on the same side. The rule therefore is "eyes look toward a hemispherical lesion and away from a brainstem lesion". "Wrong-way eyes" refers to eyes that may on a rare occasion turn paradoxically away from the side of a deep hemispherical lesion.

183 "Ocular bobbing" is diagnostic of ?

Harrison's 18th Ed. 2251

- A. Bilateral occipital infarct
- B. Bilateral pontine damage
- C. Bilateral temporal lobe infarct
- D. Cerebellar damage

"Ocular bobbing" describes a brisk downward and slow upward movement of the eyes associated with loss of horizontal eye movements and is diagnostic of bilateral pontine damage, usually from thrombosis of the basilar artery.

184 "Ocular dipping" is diagnostic of ?

Harrison's 18th Ed. 2251

- A. Diffuse cortical anoxic damage
- B. ICSOL
- C. SAH
- D. Tubercular meningitis

"Ocular dipping" is a slower, arrhythmic downward movement followed by a faster upward movement in patients with normal reflex horizontal gaze indicating diffuse cortical anoxic damage.

185 "Doll's eye" oculocephalic reflex is indicative of which of the following ?

Harrison's 18th Ed. 2251

- A. Reduced cortical influence on brainstem & damaged brainstem pathways
- B. Reduced cortical influence on brainstem & intact brainstem pathways
- C. Normal cortical influence on brainstem & damaged brainstem pathways

D. Normal cortical influence on brainstem & intact brainstem pathways

The oculocephalic reflexes, elicited by moving the head from side to side or vertically and observing eye movements in the direction opposite to the head movement, depend on the integrity of the ocular motor nuclei and their interconnecting tracts that extend from the midbrain to the pons and medulla. The movements, called somewhat inappropriately "doll's eyes" (which refers more accurately to the reflex elevation of the eyelids with flexion of the neck), are normally suppressed in the awake patient. The ability to elicit them therefore indicates both reduced cortical influence on the brainstem and intact brainstem pathways, indicating that coma is caused by a lesion or dysfunction in the cerebral hemispheres. Oculovestibular & oculocephalic reflexes provide essentially the same information.

186 Midbrain and third nerve function are tested by ?

Harrison's 18th Ed. 2250, Figure 274-3

- A. Pupillary reaction to light
- B. Spontaneous and reflex eye movements
- C. Corneal responses
- D. Respiratory & pharyngeal responses

187 Pontine function is tested by ?

Harrison's 18th Ed. 2250, Figure 274-3

- A. Pupillary reaction to light
- B. Spontaneous and reflex eye movements
- C. Respiratory responses
- D. Pharyngeal responses

188 Pontine function is tested by ?

Harrison's 18th Ed. 2250, Figure 274-3

- A. Spontaneous eye movements
- B. Reflex eye movements
- C. Corneal responses
- D. All of the above

189 Medullary function is tested by ?

Harrison's 18th Ed. 2250, Figure 274-3

- A. Pupillary reaction to light
- B. Spontaneous and reflex eye movements
- C. Corneal responses
- D. Respiratory & pharyngeal responses

In coma, midbrain & third nerve function are tested by pupillary reaction to light, pontine function by spontaneous & reflex eye movements & corneal responses, and medullary function by respiratory and pharyngeal responses.

190 Reflex conjugate, horizontal eye movements are dependent on ?

Harrison's 18th Ed. 2251

- A. Medial longitudinal fasciculus (MLF)
- B. Superior colliculus
- C. Cerebellum
- D. Temporal radiation

Reflex conjugate, horizontal eye movements are dependent on medial longitudinal fasciculus (MLF) that interconnects sixth & contralateral third nerve nuclei.

191 Acronym "COWS" that refers to "cold water opposite, warm water same" is for which of the following ?

Harrison's 18th Ed. 2251

- A. Tonic deviation of head
- B. Tonic deviation of both eyes
- C. Direction of nystagmus

D. All of the above

Head rotation (oculocephalic reflex) or caloric stimulation of the labyrinths (oculovestibular reflex) elicits contraversive eye movements. Oculovestibular test is performed by irrigating the external auditory canal with cool water in order to induce convection currents in labyrinths. After a brief latency, result is tonic deviation of both eyes to the side of cool-water irrigation and nystagmus in the opposite direction. (Acronym "COWS" refers to direction of nystagmus - "cold water opposite, warm water same.") Loss of induced conjugate ocular movements indicates brainstem damage.

192 Presence of corrective nystagmus indicates which of the following ?

Harrison's 18th Ed. 2251

- A. Frontal lobes are functioning
- B. Frontal lobes are connected to the brainstem
- C. Functional or hysterical coma is likely
- D. All of the above

Presence of corrective nystagmus indicates that the frontal lobes are functioning and connected to the brainstem; thus functional or hysterical coma is likely.

193 Corneal reflex depends on the integrity of pontine pathways between ?

Harrison's 18th Ed. 2251

- A. Fifth and same sided seventh cranial nerve
- B. Fifth and opposite sided seventh cranial nerve
- C. Fifth and both seventh cranial nerves
- D. Any of the above

Corneal reflex depends on the integrity of pontine pathways between fifth (afferent) & both seventh (efferent) cranial nerves.

194 Corneal reflex in conjunction with reflex eye movements is a useful test of ?

Harrison's 18th Ed. 2251

- A. Midbrain function
- B. Pontine function
- C. Medullary function
- D. All of the above

Corneal reflex in conjunction with reflex eye movements is a useful test of pontine function.

195 When CNS-depressant drugs are given, which of these is the first to disappear ?

Harrison's 18th Ed. 2251

- A. Corneal responses
- B. Reflex eye movements
- C. Non-reactivity of pupils to light
- D. Any of the above

CNS-depressant drugs diminish or eliminate the corneal responses soon after reflex eye movements are paralyzed but before the pupils become unreactive to light.

196 Agonal gasps are the result of damage to ?

Harrison's 18th Ed. 2251

- A. Cortex
- B. Midbrain
- C. Pons
- D. Medulla

Agonal gasps are the result of lower brainstem (medullary) damage and are recognized as the terminal respiratory pattern of severe brain damage.

197 Which of the following respiratory pattern is seen in pontomesencephalic lesions ?

Harrison's 18th Ed. 2251

- A. Shallow, slow, regular
- B. Cheyne-Stokes respiration
- C. Kussmaul breathing
- D. Tachypnea

Kussmaul or rapid, deep breathing is usually seen in metabolic acidosis but may also occur with pontomesencephalic lesions.

198 Cheyne-Stokes respiration in its classic cyclic form is seen in which of the following conditions ?

Harrison's 18th Ed. 2251

- A. Light coma
- B. Deep coma
- C. Sleep
- D. Awake state

Cheyne-Stokes respiration in its classic cyclic form signifies bihemispherical damage or metabolic suppression and commonly accompanies light coma.

199 Tachypnea occurs in which of the following conditions ?

Harrison's 18th Ed. 2251

- A. Tuberculosis of CNS
- B. Lymphoma of CNS
- C. Fungal infection of CNS
- D. All of the above

Tachypnea occurs with lymphoma of the CNS.

200 In nonhabituated patients, what level of ethanol causes impaired mental activity ?

Harrison's 18th Ed. 2251

- A. 0.2 g/dL
- B. 0.3 g/dL
- C. 0.4 g/dL
- D. 0.5 g/dL

201 In nonhabituated patients, what level of ethanol is associated with stupor ?

Harrison's 18th Ed. 2251

- A. 0.2 g/dL
- B. 0.3 g/dL
- C. 0.4 g/dL
- D. 0.5 g/dL

In nonhabituated patients, generally an ethanol level of 43 mmol/L (0.2 g/dL) causes impaired mental activity and a level of >65 mmol/L (0.3 g/dL) is associated with stupor.

202 Most cases of coma (and confusion) are due to ?

Harrison's 18th Ed. 2251

- A. Hemorrhage
- B. Tumor
- C. Metabolic or toxic origin
- D. Hydrocephalus

Most cases of coma (and confusion) are metabolic or toxic in origin.

203 In a case of coma, which of the following may not be detected by CT scan ?

Harrison's 18th Ed. 2251

- A. Acute brainstem infarction

- B. Sagittal sinus thrombosis
- C. Encephalitis
- D. All of the above

Bilateral hemisphere infarction, acute brainstem infarction, encephalitis, meningitis, mechanical shearing of axons (closed head trauma), sagittal sinus thrombosis, and subdural hematoma isodense to adjacent brain may not be detected.

204 In coma, EEG is useful in which of the following conditions ?

Harrison's 18th Ed. 2251

- A. Clinically unrecognized seizure
- B. Herpesvirus encephalitis
- C. Prion (Creutzfeldt-Jakob) disease
- D. All of the above

The EEG is useful in metabolic or drug-induced states and is diagnostic when coma is due to clinically unrecognized seizure, to herpesvirus encephalitis, or to prion (Creutzfeldt-Jakob) disease.

205 Which of the following is typical of metabolic coma ?

Harrison's 18th Ed. 2251

- A. Delta or triphasic waves in the frontal regions
- B. Widespread fast beta activity
- C. Widespread variable 8- to 12-Hz activity
- D. Normal alpha activity

Predominant high-voltage slowing (delta or triphasic waves) in the frontal regions is typical of metabolic coma.

206 Which of the following is typical of coma due to sedative drugs (diazepines, barbiturates) ?

Harrison's 18th Ed. 2251

- A. Delta or triphasic waves in the frontal regions
- B. Widespread fast beta activity
- C. Widespread variable 8- to 12-Hz activity
- D. Normal alpha activity

Widespread fast beta activity implies sedative drugs (diazepines, barbiturates) as a cause of coma.

207 Alpha coma results from ?

Harrison's 18th Ed. 2252

- A. Hyperventilation
- B. Hypoglycemia
- C. Pontine damage
- D. Subdural hematoma

Alpha coma results from pontine or diffuse cortical damage and is associated with a poor prognosis.

208 Which of the following is typical of locked-in syndrome ?

Harrison's 18th Ed. 2252

- A. Delta or triphasic waves in the frontal regions
- B. Widespread fast beta activity
- C. Widespread variable 8- to 12-Hz activity
- D. Normal alpha activity

Normal alpha activity on EEG is found in locked-in syndrome, hysteria or catatonia.

209 Which of the following condition causes sudden coma ?

Harrison's 18th Ed. 2252

- A. Acute hydrocephalus
- B. Basilar artery embolism
- C. Cerebral infarction

- D. Encephalitis

Conditions that cause sudden coma include drug ingestion, cerebral hemorrhage, trauma, cardiac arrest, epilepsy, or basilar artery embolism.

210 Gaze paresis is a feature of which cerebrovascular disease ?

Harrison's 18th Ed. 2252

- A. Thalamic hemorrhage
- B. Pontine hemorrhage
- C. Cerebellar hemorrhage
- D. Subarachnoid hemorrhage

Occipital headache, vomiting, gaze paresis, and inability to stand are features of cerebellar hemorrhage.

211 Asymmetric limb paresis is a feature of which cerebrovascular disease ?

Harrison's 18th Ed. 2252

- A. Basilar artery thrombosis
- B. Infarction in middle cerebral artery territory
- C. Acute hydrocephalus
- D. Subarachnoid hemorrhage

212 Neurologic prodrome or warning spells are a feature of which of the following ?

Harrison's 18th Ed. 2252

- A. Basilar artery thrombosis
- B. Infarction in middle cerebral artery territory
- C. Acute hydrocephalus
- D. Subarachnoid hemorrhage

Neurologic prodrome or warning spells, diplopia, dysarthria, vomiting, eye movement and corneal response abnormalities, and asymmetric limb paresis are features of basilar artery thrombosis.

213 Hyperventilation and excessive sweating are a feature of which cerebrovascular disease ?

Harrison's 18th Ed. 2252

- A. Thalamic hemorrhage
- B. Pontine hemorrhage
- C. Cerebellar hemorrhage
- D. Subarachnoid hemorrhage

Sudden onset, pinpoint pupils, loss of reflex eye movements and corneal responses, ocular bobbing, posturing, hyperventilation, and excessive sweating are features of pontine hemorrhage.

214 Vomiting is a feature of which of the following ?

Harrison's 18th Ed. 2252

- A. Thalamic hemorrhage
- B. Cerebellar hemorrhage
- C. Subarachnoid hemorrhage
- D. All of the above

215 Precipitous coma after headache and vomiting is a feature of which of the following ?

Harrison's 18th Ed. 2252

- A. Thalamic hemorrhage
- B. Pontine hemorrhage
- C. Cerebellar hemorrhage
- D. Subarachnoid hemorrhage

Precipitous coma after headache and vomiting is a feature of subarachnoid hemorrhage.

- 216 Acute hydrocephalus accompanies particularly which of the following ?**

Harrison's 18th Ed. 2252

- A. Thalamic hemorrhage
- B. Pontine hemorrhage
- C. Cerebellar hemorrhage
- D. Subarachnoid hemorrhage

The syndrome of acute hydrocephalus accompanies particularly subarachnoid hemorrhage.

- 217 Which of the following diseases cause meningeal irritation ?**

Harrison's 18th Ed. 2252, Table 274-1

- A. Fat embolism
- B. Cholesterol embolism
- C. Carcinomatous meningitis
- D. All of the above

Fat embolism, cholesterol embolism, carcinomatous and lymphomatous meningitis cause meningeal irritation with or without fever, and with an excess of WBCs or RBCs in CSF, usually without focal or lateralizing cerebral or brainstem signs. CT or MRI shows no mass lesion.

- 218 Which of the following diseases cause focal brainstem or lateralizing cerebral signs ?**

Harrison's 18th Ed. 2252, Table 274-1

- A. Herpes simplex encephalitis
- B. Thrombotic thrombocytopenic purpura
- C. Pituitary apoplexy
- D. All of the above

- 219 Cellular content of the CSF is not normal in which of the following ?**

Harrison's 18th Ed. 2252, Table 274-1

- A. Malaria
- B. Fat embolism
- C. Typhoid fever
- D. Eclampsia

- 220 Which of the following is a feature of brain death ?**

Harrison's 18th Ed. 2252

- A. Heart rate unresponsive to atropine
- B. Diabetes insipidus
- C. Absent Babinski signs
- D. All of the above

- 221 In a valid apnea testing, P_{CO_2} should be at least ?**

Harrison's 18th Ed. 2253

- A. 30 - 40 mmHg
- B. 40 - 50 mmHg
- C. 50 - 60 mmHg
- D. 60 - 70 mmHg

To confirm brain death, apnea is confirmed if no respiratory effort is observed in the presence of a sufficiently elevated P_{CO_2} i.e. 50 - 60 mmHg.

Chapter 3 68. Neuroimaging in Neurologic Disorders

- 222 Which of the following investigation is recommended in meningeal disease ?**

Harrison's 18th Ed. 3240, Table 368-1

- A. CT (noncontrast)
- B. CT contrast
- C. MRI
- D. MRI with contrast

- 223 Which of the following investigation is recommended in myelopathy ?**

Harrison's 18th Ed. 3240, Table 368-1

- A. CT (noncontrast)
- B. CT contrast
- C. MRI
- D. MRI with contrast

- 224 MRI + contrast is the investigation of choice for all of the following except ?**

Harrison's 18th Ed. 3240, Table 368-1

- A. Neoplasm (primary or metastatic)
- B. White matter disorders
- C. Infection/abscess
- D. Immunosuppressed with focal findings

- 225 Which of the following is the most sensitive technique for detecting acute ischemic stroke of brain ?**

Harrison's 18th Ed. 3240

- A. CT angiography (CTA)
- B. Perfusion CT (pCT)
- C. MR angiography (MRA)
- D. Diffusion MR

Diffusion MR is the most sensitive technique for detecting acute ischemic stroke of brain or spinal cord, encephalitis, abscesses and prion diseases.

- 226 In normal CNS, which of the following structure lacks blood-brain barrier (BBB) ?**

Harrison's 18th Ed. 3241

- A. Pituitary gland
- B. Choroid plexus
- C. Dura
- D. All of the above

In normal CNS, the pituitary gland, choroid plexus, and dura lack blood-brain barrier (BBB) and enhance after contrast administration.

- 227 In a routine brain CT study, radiation dose is normally about ?**

Harrison's 18th Ed. 3241

- A. 0.2 to 1 mSv
- B. 2 to 5 mSv
- C. 6 to 12 mSv
- D. 22 to 50 mSv

In a routine brain CT study, radiation dose is normally between 2 and 5 mSv (millisievert).

- 228 Rise in serum creatinine of at least 1 mg/dL within how many hours of contrast administration defines contrast nephropathy ?**

Harrison's 18th Ed. 3241

- A. 6 hours
- B. 12 hours
- C. 24 hours
- D. 48 hours

229 Risk factors for contrast nephropathy include all except ?

Harrison's 18th Ed. 3241

- A. Solitary kidney
- B. Diabetes mellitus
- C. Hypertension
- D. Advanced age (>80 years)

Risk factors for contrast nephropathy include advanced age (>80 years), preexisting renal disease (serum creatinine exceeding 2 mg/dL), solitary kidney, diabetes mellitus, dehydration, paraproteinemia, concurrent use of nephrotoxic medication or chemotherapeutic agents, and high contrast dose.

230 What is the eGFR threshold below which iodinated contrast should not be given ?

Harrison's 18th Ed. 3243

- A. 90 mL/min/1.73²
- B. 75 mL/min/1.73²
- C. 60 mL/min/1.73²
- D. 45 mL/min/1.73²

The American College of Radiology suggests using an estimated glomerular filtration rate (eGFR) of 45 mL/min/1.73² as a threshold below which iodinated contrast should not be given without serious consideration of the potential for contrast nephropathy.

231 Use of which of the following may reduce the incidence of contrast nephropathy ?

Harrison's 18th Ed. 3243

- A. Acetylcysteine
- B. Oxygen inhalation
- C. Osmolar diuretics
- D. Loop diuretics

Apart from hydration and reduction in dose of contrast media, use of bicarbonate & acetylcysteine may reduce the incidence of contrast nephropathy.

232 Severe allergic reactions occur in what proportion of patients receiving nonionic media ?

Harrison's 18th Ed. 3243

- A. 0.04 %
- B. 0.12 %
- C. 0.18 %
- D. 0.24 %

Severe allergic reactions occur in 0.04% of patients receiving nonionic media, sixfold lower than with ionic media.

233 Which of the following is not related to magnetic resonance imaging (MRI) ?

Harrison's 18th Ed. 3243

- A. Hydrogen protons in biologic tissues
- B. Dynamic magnetic field
- C. Static magnetic field
- D. Radiofrequency (Rf) waves

MRI is a complex interaction between hydrogen protons in biologic tissues, a static magnetic field (the magnet), and energy (echo) in the form of radiofrequency (Rf) waves of a specific frequency.

234 T2W images are more sensitive than T1W images to all of the following except ?

Harrison's 18th Ed. 3244

- A. Edema
- B. Fat-containing structures

- C. Demyelination
- D. Infarction

T2-weighted (T2W) images are more sensitive than T1-weighted (T1W) images to edema, demyelination, infarction, and chronic hemorrhage, while T1W imaging is more sensitive to subacute hemorrhage and fat-containing structures.

235 Which of the following statements about gadolinium is false ?

Harrison's 18th Ed. 3244

- A. Heavy-metal element
- B. Paramagnetic substance
- C. Chelated to DTPA
- D. Approximate dose 2 mL/kg IV

Approximate dose of gadolinium is 0.2 mL/kg body weight administered intravenously. Gadolinium has the greatest ability to capture thermal neutrons.

236 Gadolinium is produced both from which of the following minerals ?

- A. Ilmenite
- B. Zircon
- C. Monazite
- D. Sillimanite

Gadolinium is produced both from monazite and bastnäsite.

237 Which of the following countries has deposits of monazite sands ?

- A. India
- B. Brazil
- C. South Africa
- D. All of the above

238 Symbol of Gadolinium is ?

- A. Ga
- B. Gd
- C. Gl
- D. Gm

Symbol of Gadolinium is Gd with atomic number 64 and atomic weight of 157.25.

239 Which of the following is best related to gadolinium contrast agents ?

Harrison's 18th Ed. 3244

- A. Nephrogenic diabetes insipidus (NDI)
- B. Nephrogenic Syndrome of Inappropriate Antidiuresis
- C. Nephrogenic systemic fibrosis (NSF)
- D. Nephrotic syndrome

Patients with renal insufficiency exposed to gadolinium contrast agents may develop a rare complication - nephrogenic systemic fibrosis (NSF) between 5 and 75 days following exposure.

240 Nephrogenic systemic fibrosis (NSF) involves which of the following parts of the body most ?

Cleveland Clinic Journal of Medicine 2008;75(2):95-111

- A. Upper extremities
- B. Between ankles and thighs
- C. Trunk
- D. Face

241 Nephrogenic systemic fibrosis (NSF) involves which of the following parts of the body least ?

Cleveland Clinic Journal of Medicine 2008;75(2):95-111

- A. Upper extremities
- B. Between ankles and thighs
- C. Trunk
- D. Face

NSF typically presents between ankles and the thighs (symmetric, progresses to involve the entire lower extremities). Upper extremity involvement occurs frequently, but usually with lower extremity disease. Trunk is involved less commonly than legs and arms. The face is typically spared.

242 Which of the following is a laboratory biomarker for NSF ?

Cleveland Clinic Journal of Medicine 2008;75(2):95-111

- A. Anti nuclear antibodies
- B. Rheumatoid factor
- C. Anti-SCL70 antibodies
- D. None of the above

There is no laboratory biomarker for NSF.

243 Which of the following is characteristic and pathognomonic of NSF ?

Cleveland Clinic Journal of Medicine 2008;75(2):95-111

- A. Proliferation of dermal spindle cells
- B. Thick collagen bundles with surrounding clefts
- C. Immunohistochemically CD34 reactivity in fibroblast-like cells
- D. Absence of mucin and elastic fibers

A characteristic and almost pathognomonic staining profile is the immunohistochemical identification of CD34 reactivity in the fibroblast-like cells. Cells expressing CD34 are normally found in the umbilical cord, the bone marrow (as pluripotential hematopoietic stem cells), and in the vascular endothelium.

244 Disorder that causes thickening & hardening of skin of extremities & trunk is ?

Cleveland Clinic Journal of Medicine 2008;75(2):95-111

- A. Systemic sclerosis
- B. Scleromyxedema
- C. Eosinophilic fasciitis
- D. All of the above

Besides NSF, other disorders that can cause thickening & hardening of skin of extremities & trunk include systemic sclerosis or scleroderma, scleromyxedema, and eosinophilic fasciitis.

245 Most frequently used radionuclide moiety in Positron Emission Tomography (PET) is ?

Harrison's 18th Ed. 3248

- A. 2-[¹⁶F]fluoro-2-deoxy-d-glucose
- B. 2-[¹⁷F]fluoro-2-deoxy-d-glucose
- C. 2-[¹⁸F]fluoro-2-deoxy-d-glucose
- D. 2-[¹⁹F]fluoro-2-deoxy-d-glucose

In Positron Emission Tomography (PET), the most frequently used moiety is 2-[¹⁸F]fluoro-2-deoxy-d-glucose (FDG), an analogue of glucose. It is taken up by cells competitively with 2-deoxyglucose.

369 - Seizures and Epilepsy

246 Seizure is derived from a Latin word “sacire” that means ?

Harrison's 18th Ed. 3251

- A. “to invade”

- B. “to destroy”
- C. “to silence”
- D. “to take possession of”

Seizure is derived from Latin word “sacire” meaning “to take possession of”.

247 What percentage of population will have at least one seizure in lifetime ?

Harrison's 18th Ed. 3251

- A. ~1 - 3 %
- B. ~3 - 5 %
- C. ~5 - 10 %
- D. ~10 - 15 %

248 Highest incidence of seizure is in which of the following age groups ?

Harrison's 18th Ed. 3251

- A. Infancy
- B. Early childhood & late adulthood
- C. Middle age
- D. Old age

~5–10% percentage of population will have at least one seizure in lifetime and the highest incidence is in early childhood and late adulthood.

249 Which of the following is false about epilepsy ?

Harrison's 18th Ed. 3251

- A. Single seizure
- B. Acute
- C. Correctable or avoidable circumstance
- D. All of the above

Epilepsy is a clinical phenomenon & is said to be present when a person has recurrent seizures due to a chronic, underlying process. A person with a single seizure or recurrent seizures due to correctable or avoidable circumstances, does not have epilepsy. By definition, epilepsy is two or more UNPROVOKED seizures.

250 In which year did the International League Against Epilepsy (ILAE) classify seizure disorders ?

Harrison's 17th Ed. 2498

- A. 1965
- B. 1978
- C. 1981
- D. 1995

In 1981, the International League against Epilepsy (ILAE) classification is based on clinical features of seizures and associated EEG findings. Etiology or cellular substrate are not considered.

251 Focal seizures are associated with ?

Harrison's 18th Ed. 3251

- A. Structural abnormalities of brain
- B. Cellular abnormalities
- C. Biochemical abnormalities
- D. All of the above

Focal seizures are associated with structural abnormalities of brain, there are exception though. In the new classification system (International League against Epilepsy (ILAE) Commission on Classification and Terminology, 2005–2009), term partial seizures is no longer used and subcategories of “simple focal seizures” and “complex focal seizures” have been eliminated.

252 **Generalized seizures are associated with ?**

Harrison's 18th Ed. 3251

- A. Cellular abnormality
- B. Biochemical abnormality
- C. Structural abnormality
- D. Any of the above

Generalized seizures may result from cellular, biochemical, or structural abnormalities.

253 **Main difference between simple partial and complex partial seizure is ?**

Harrison's 17th Ed. 2498

- A. Unilateral or bilateral
- B. Focal or generalised
- C. Consciousness or unconsciousness
- D. Absence or presence of aura

If consciousness is fully preserved during seizure, it is termed simple partial seizure. If consciousness is impaired, the seizure is termed complex partial seizure.

254 **Which of the following is a feature of focal motor seizure ?**

Harrison's 18th Ed. 3252

- A. Jacksonian march
- B. Todd's paralysis
- C. Epilepsia partialis continua
- D. All of the above

In focal motor seizures, after initiation from a restricted region, abnormal discharges may spread to other wider areas. This is called a "Jacksonian march". Following focal motor seizure, patient may have localized paresis in the involved region for minutes to many hours (Todd's paralysis). Focal motor seizure may continue for hours or days (epilepsia partialis continua).

255 **Which of the following about complex partial seizures is false ?**

Harrison's 17th Ed. 2499

- A. Begins with an aura
- B. Behavioral arrest denotes beginning of ictal phase
- C. Reterograde amnesia
- D. Automatisms

Complex partial seizures are characterized by focal seizure activity with transient unconsciousness, beginning with an aura. Behavioral arrest or motionless stare denotes beginning of ictal phase which marks the onset of the period of amnesia & automatisms. Following seizure anterograde amnesia, confusion or postictal aphasia may be present.

256 **Which of the following is false about absence seizures ?**

Harrison's 18th Ed. 3252

- A. Sudden, brief loss of consciousness with loss of postural control
- B. Typically lasts for only seconds
- C. Consciousness returns as suddenly as it was lost
- D. No postictal confusion

Absence seizures are characterized by sudden, brief lapses of consciousness "without" loss of postural control. Patients stare & cease normal activity for a few seconds, return immediately to normal & have no memory of the event or no postictal confusion.

257 **Which of the following is false about absence seizures ?**

Harrison's 18th Ed. 3252

- A. Usually begin in childhood (4 to 8 yrs)
- B. EEG shows generalized, symmetric, 3-Hz spike-&-wave
- C. EEG discharge begin & end suddenly on an abnormal background
- D. Hyperventilation provokes EEG discharges & seizures

The EEG hallmark of typical absence seizures is a generalized, symmetric, 3-Hz spike-and-wave discharge that begins and ends suddenly, superimposed on a "normal" EEG background. Hyperventilation provokes these EEG discharges.

258 **Which of the following will trigger a seizure in most patients with untreated absence seizures ?**

- A. Exercise
- B. Hyperventilation
- C. Breath holding
- D. Lack of sleep

Hyperventilation for 3 minutes will trigger a seizure in most patients with untreated absence seizures.

259 **What percentage of patients of typical absence seizures will have a spontaneous remission during adolescence ?**

Harrison's 17th Ed. 2499

- A. ~ 10 - 20 %
- B. ~ 30 - 40 %
- C. ~ 50 - 60 %
- D. ~ 60 - 70 %

~ 60-70% patients of absence seizures have a spontaneous remission during adolescence.

260 **In atypical absence seizures, EEG finding of generalized, spike-and-wave pattern has a frequency of ?**

Harrison's 18th Ed. 3252

- A. <= 4.0 per second
- B. <= 3.5 per second
- C. <= 3.0 per second
- D. <= 2.5 per second

EEG in atypical absence seizures shows a generalized, slow spike-and-wave pattern with a frequency of <= 2.5 per second, as well as other abnormal EEG activity.

261 **When compared to typical absence seizures, patients with atypical absence seizures have ?**

Harrison's 18th Ed. 3252

- A. Lapse of consciousness of longer duration
- B. Less abrupt onset and cessation
- C. Less response to anticonvulsants
- D. All of the above

262 **Which of the following gene for with various epilepsy syndromes is associated with severe mental retardation ?**

Harrison's 18th Ed. 3252 Table 369-2

- A. CHRNA4
- B. KCNQ2
- C. SCN1B
- D. Doublecortin

Doublecortin (Xq21-24), expressed primarily in frontal lobes directly regulates microtubule polymerization and bundling. X-linked dominant classic lissencephaly is associated with severe mental retardation and seizures in males, subcortical band heterotopia with more subtle findings in females.

263 **The most common seizure type resulting from metabolic derangements is ?**

Harrison's 18th Ed. 3252

- A. Absence Seizures
- B. Myoclonic Seizures
- C. Grand Mal seizures

D. Atonic Seizures

Grand Mal seizures are the main seizure type in ~10% of all persons with epilepsy. They are also the most common seizure type resulting from metabolic derangements.

264 "Ictal cry" is related to tonic contraction of which of the following ?

Harrison's 18th Ed. 3253

- A. Muscles of inspiration and larynx
- B. Muscles of expiration and larynx
- C. Muscles of inspiration and pharynx
- D. Muscles of expiration and pharynx

Tonic contraction of muscles of expiration and larynx at the onset will produce a loud moan or "Ictal cry".

265 Ictal cry is observed in which phase of Grand Mal seizure ?

Harrison's 18th Ed. 3253

- A. Pre - ictal phase
- B. Ictal phase
- C. Post - ictal phase
- D. Any of the above

Initial phase of Grand Mal seizure is tonic contraction of muscles throughout the body. Tonic contraction of muscles of expiration and larynx at the onset produces a loud moan or "ictal cry".

266 During tonic phase of Grand Mal seizure, which of the following does not occur ?

Harrison's 18th Ed. 3253

- A. Increase in heart rate
- B. Increase in blood pressure
- C. Impaired respiration
- D. Constriction of pupils

A marked enhancement of sympathetic tone during ictal phase of Grand Mal seizure leads to increases in heart rate, blood pressure, and pupillary size. Respiration is impaired.

267 In Grand Mal seizure, initial tonic phase evolves into clonic phase after ?

Harrison's 18th Ed. 3253

- A. 10 - 20 seconds
- B. 30 - 60 seconds
- C. 60 - 120 seconds
- D. 120 - 180 seconds

In Grand Mal seizure, initial tonic phase evolves into clonic phase after 10 - 20 seconds. Ictal phase usually lasts no more than 1 minute.

268 Postictal phase in Grand Mal seizures is characterized by all except ?

Harrison's 18th Ed. 3253

- A. Irritability
- B. Bladder or bowel incontinence
- C. Muscular flaccidity
- D. Excessive salivation

Postictal phase in Grand Mal seizures is characterized by unresponsiveness, muscular flaccidity, excessive salivation and bladder or bowel incontinence.

269 Which of the following is typical of EEG of clonic phase of Grand Mal seizure ?

Harrison's 18th Ed. 3253

- A. High-amplitude activity interrupted by slow waves

- B. High-amplitude activity interrupted by fast waves

- C. Low-amplitude activity interrupted by slow waves

- D. Low-amplitude activity interrupted by fast waves

EEG during the tonic phase of Grand Mal seizure shows a progressive increase in generalized low-voltage fast activity, followed by generalized high-amplitude, polyspike discharges. In clonic phase, high-amplitude activity is typically interrupted by slow waves to create a spike-and-wave pattern.

270 Which of the following is false about atonic seizures ?

Harrison's 18th Ed. 3253

- A. Sudden loss of postural muscle tone
- B. Consciousness is briefly impaired
- C. Significant postictal confusion
- D. Seen in association with known epilepsy syndromes

Atonic seizures are characterized by sudden loss of postural muscle tone lasting 1-2 seconds. Consciousness is briefly impaired, but there is usually no postictal confusion. Atonic seizures are usually seen in association with known epilepsy syndromes.

271 Myoclonic seizure is a type of ?

Harrison's 17th Ed. 2498

- A. Primary generalized seizure
- B. Secondary generalized seizure
- C. Simple partial seizure
- D. Complex partial seizure

272 Pathologic myoclonus is mostly seen in association with ?

Harrison's 18th Ed. 3253

- A. Metabolic disorders
- B. Degenerative CNS diseases
- C. Anoxic brain injury
- D. All of the above

Pathologic myoclonus is commonly seen with metabolic disorders, degenerative CNS diseases or anoxic brain injury.

273 Giant slow waves relate best with which of the following ?

Harrison's 18th Ed. 3253

- A. Atonic seizures
- B. Myoclonic seizure
- C. Epileptic spasms
- D. Atypical absence seizures

EEG in epileptic spasms shows hypsarrhythmias (diffuse, giant slow waves with a chaotic background of irregular, multifocal spikes and sharp waves).

274 "Electrodecremental response" in EEG is a feature of ?

Harrison's 18th Ed. 3253

- A. Atonic seizures
- B. Myoclonic seizure
- C. Epileptic spasms
- D. Atypical absence seizures

"Electrodecremental response" or a marked suppression of EEG background is a feature of epileptic spasms.

275 Seizures in Juvenile myoclonic epilepsy (JME) are most frequent in ?

Harrison's 18th Ed. 3253, N Engl J Med 1999;340:1565

- A. Morning
- B. Afternoon

- C. Evening
- D. Night

Syndrome of JME, also known as Janz syndrome, accounts for ~7% of all cases of epilepsy. It is characterized by onset of myoclonic seizures, generalized tonic-clonic seizures, & absence seizures in adolescents (12 - 18 years) who have normal intellectual function, with EEG findings of rapid, generalized spike-wave & polyspike-wave discharges. They are most frequent in morning and can be provoked by sleep deprivation. Consciousness is preserved.

- 276 Which of the following statements about Lennox-Gastaut syndrome is true ?
Harrison's 18th Ed. 3253
- A. Multiple seizure types
 - B. EEG shows slow (<3 Hz) spike-&-wave discharges
 - C. Impaired cognitive function
 - D. All of the above

Triad of Lennox-Gastaut syndrome includes multiple seizure types, slow (<3 Hz) spike-and-wave discharges on EEG and impaired cognitive function.

- 277 Seizure types in Lennox-Gastaut syndrome include all except ?
Harrison's 18th Ed. 3253
- A. Generalized tonic-clonic
 - B. Atonic
 - C. Myoclonic
 - D. Atypical absence seizures

In children with Lennox-Gastaut syndrome, multiple seizure types include generalized tonic-clonic, atonic and atypical absence seizures.

- 278 Most common syndrome associated with focal seizures with dyscognitive features is ?
Harrison's 18th Ed. 3253
- A. Mesial temporal lobe epilepsy (MTLE)
 - B. Lennox-Gastaut syndrome
 - C. Juvenile myoclonic epilepsy (JME)
 - D. All of the above

Mesial temporal lobe epilepsy (MTLE) is the most common syndrome associated with focal seizures with dyscognitive features. Formerly it was known as "psychomotor epilepsy" (Gibbs et al, 1940).

- 279 In Mesial temporal lobe epilepsy (MTLE), the characteristic MRI finding is ?
Harrison's 18th Ed. 3253
- A. Hippocampal calcification
 - B. Hippocampal sclerosis
 - C. Increased signal intensity in frontotemporal region
 - D. Normal MRI

On MRI, characteristic & essential finding of MTLE is hippocampal sclerosis.

- 280 In Mesial temporal lobe epilepsy (MTLE), the MRI finding include all except ?
Harrison's 18th Ed. 3255 Table 369-3
- A. Small hippocampus
 - B. Small temporal lobe
 - C. Small temporal horn
 - D. Hippocampal sclerosis

MRI findings in Mesial Temporal Lobe Epilepsy Syndrome include small hippocampus, small temporal lobe, enlarged temporal horn and hippocampal sclerosis.

- 281 Intracranial amobarbital or Wada test is performed for ?
- A. Circulation adequacy of cerebral hemispheres
 - B. IQ level
 - C. Cerebral functions are localized to which hemisphere
 - D. Sleep pattern

Named after Canadian neurologist Juhn A. Wada (University of British Columbia), this test is used to establish which cerebral functions are localized to which hemisphere. It is also known as the "intracarotid sodium amobarbital procedure" (ISAP) and is performed prior to ablative surgery for epilepsy and prior to tumor resection. The aim is to determine which side of the brain is responsible for certain vital cognitive functions, namely speech and memory. Sodium amobarbital is injected into one cerebral hemisphere at a time. Material-specific memory deficits on intracranial amobarbital (Wada) test is a feature of MTLE.

- 282 Which of the following about Generalized epilepsy with febrile seizures plus (GEFS+) is false ?
Harrison's 18th Ed. 3254 Table 369-2
- A. Autosomal dominant inheritance
 - B. Presents with febrile seizures
 - C. May have variable seizure types not associated with fever
 - D. Autosomal recessive inheritance

"Generalized epilepsy with febrile seizures plus" is a genetic syndrome consisting of febrile seizures plus at least one other type of seizure (absence, myoclonic, atonic, or afebrile generalized tonic-clonic seizures). It has autosomal dominant inheritance.

- 283 Which of the following gene is associated with Generalized epilepsy with febrile seizures plus (GEFS+) ?
Harrison's 18th Ed. 3254 Table 369-2
- A. CHRNA4
 - B. SCN1B
 - C. KCNQ2
 - D. LGI1

In Generalized epilepsy with febrile seizures plus (GEFS+), mutation occurs in the SCN1B (19q12.1) gene for the voltage-gated sodium channel which modifies gating and inactivation properties of the channel. Mutations in other sodium channel subunits (SCN1A and SCN2A) and GABAA receptor subunit (GABRG2 and GABRA1) have been reported.

- 284 Which of the following about Benign familial neonatal convulsions (BFNC) is false ?
Harrison's 18th Ed. 3254 Table 369-2
- A. Autosomal dominant inheritance
 - B. Onset in first week of life
 - C. Mutations in KCNQ2 (20q13.3)
 - D. None of the above

BFNC has autosomal dominant inheritance with onset in 1st week of life. Infants are normal with no neurologic or metabolic abnormality. Mutations have been identified in KCNQ2, gene for potassium channels on chromosomes 20q.

- 285 Gene responsible for progressive myoclonus epilepsy (PME) or Unverricht-Lundborg disease is ?
Harrison's 18th Ed. 3254 Table 369-2
- A. LGI1
 - B. EPM2A
 - C. CSTB
 - D. SCN1B

Progressive myoclonus epilepsy (PME) (Unverricht-Lundborg disease) has autosomal recessive inheritance with age of onset between 6-15 years presenting as myoclonic seizures, ataxia and progressive cognitive decline. CSTB mutation causes PME.

286 Which of the following is false about Progressive myoclonus epilepsy (Lafora's disease) ?

Harrison's 18th Ed. 3254 Table 369-2

- A. Autosomal recessive inheritance
- B. Age of onset - 6 to 19 years
- C. Polyglucosan intracellular inclusion bodies
- D. Gene mutation in SCN1B

Gene mutation occurs in EPM2A (6q24). The protein tyrosine phosphatase (PTP) - Laforin influences glycogen metabolism.

287 Gene responsible for Autosomal dominant nocturnal frontal lobe epilepsy (ADNFLE) is ?

Harrison's 18th Ed. 3254 Table 369-2

- A. CHRNA4
- B. EPM2A
- C. CSTB
- D. SCN1B

Autosomal dominant nocturnal frontal lobe epilepsy (ADNFLE) occurs during childhood & presents as brief, nighttime seizures with prominent motor movements. Gene responsible is CHRNA4 (20q13.2).

288 Which of the following about Autosomal dominant partial epilepsy with auditory features (ADPEAF) is false ?

Harrison's 18th Ed. 3254 Table 369-2

- A. Type of idiopathic lateral temporal lobe epilepsy
- B. Age of onset usually between 10 and 25 years
- C. Gene mutation in LGI1 (10q24)
- D. None of the above

289 Episodic dyscontrol syndrome is also called ?

- A. Rage attacks
- B. Time attacks
- C. Ground attacks
- D. Wall attacks

290 West's syndrome includes ?

- A. Infantile spasms
- B. Mental retardation
- C. Hypsarrhythmic EEG
- D. All of the above

West syndrome is a triad of infantile spasms, mental retardation & hypsarrhythmic EEG pattern.

291 Dravet syndrome best relates to which of the following ?

- A. Myoclonic epilepsies due to storage diseases
- B. Severe myoclonic epilepsy in infancy
- C. Febrile convulsions
- D. Early cryptogenic focal epilepsy

292 Characteristics of Landau-Kleffner syndrome include ?

- A. Auditory agnosia or "word deafness"
- B. Normal hearing
- C. Abnormal electrical brain activity
- D. All of the above

A childhood disorder, in LKS there occurs gradual or sudden loss of ability to understand and use spoken language (auditory agnosia or "word deafness"). All children with LKS have abnormal EEG and may have epileptic seizures usually at night. Hearing tests show normal hearing.

293 Which of the following schistosomes causes Jacksonian epilepsy ?

Harrison's 18th Ed. 1756

- A. S. japonicum
- B. S. mansoni
- C. S. haematobium
- D. S. mekongi

294 Which of the following schistosomes is associated with associated with transverse myelitis ?

Harrison's 18th Ed. 1756

- A. S. japonicum
- B. S. intercalatum
- C. S. haematobium
- D. S. mekongi

295 Which of the following schistosomes is associated with associated with transverse myelitis ?

Harrison's 18th Ed. 1756

- A. S. japonicum
- B. S. mansoni
- C. S. intercalatum
- D. S. mekongi

296 Which of the following schistosomes belongs to the urinary species ?

Harrison's 18th Ed. 1756

- A. S. japonicum
- B. S. haematobium
- C. S. intercalatum
- D. S. mekongi

CNS schistosomiasis occurs as Jacksonian epilepsy due to S. japonicum infection. S. mansoni & S. haematobium infections have been associated with transverse myelitis. S. haematobium infection leads to dysuria, frequency and hematuria.

297 Which of the following is false about seizures due to inborn errors of metabolism ?

Harrison's 18th Ed. 3255

- A. Occur once regular feeding begins
- B. Occur typically 2 - 3 days after birth
- C. Idiosyncratic side effect to Valproic acid common
- D. None of the above

298 Pyridoxine deficiency causes seizures during ?

Harrison's 18th Ed. 3255

- A. Neonatal period (<1 month)
- B. Infants and children (>1 month and <12 years)
- C. Adolescents (12 - 18 years)
- D. Young adults (18 - 35 years)

Pyridoxine (vitamin B6) deficiency is an important cause of neonatal seizures.

299 Febrile seizures have a peak incidence between ?

Harrison's 18th Ed. 3256

- A. 1 and 3 months
- B. 3 and 9 months
- C. 9 and 18 months

- D. 18 and 24 months

Febrile seizures usually occur between 3 months and 5 years of age and have a peak incidence between 18 and 24 months.

300 Febrile seizure is likely to occur during ?

Harrison's 18th Ed. 3256

- A. Rising phase of temperature curve
- B. Peak of temperature curve
- C. Declining phase of temperature curve
- D. Any of the above

Febrile seizure is likely to occur during the rising phase of the temperature curve.

301 Which of the following is false about complex febrile seizures ?

Harrison's 18th Ed. 3256

- A. Duration > 15 minutes
- B. Repeated seizure activity
- C. Not associated with increased risk of developing epilepsy
- D. Focal features

Complex febrile seizures are characterized by repeated seizure activity, duration >15 minutes, or by focal features. Simple febrile seizures are not associated with an increase in the risk of developing epilepsy, while complex febrile seizures have a risk of 2 - 5 %.

302 Primary epilepsy syndromes present during which of the following age groups ?

Harrison's 18th Ed. 3256

- A. Neonatal period (<1 month)
- B. Infants and children (>1 month and <12 years)
- C. Adolescents (12 - 18 years)
- D. Young adults (18 - 35 years)

303 Acute seizure in older adults is mostly due to ?

Harrison's 18th Ed. 3256

- A. Embolic stroke
- B. Hemorrhagic stroke
- C. Thrombotic stroke
- D. All of the above

Acute seizures occurring at the time of stroke are seen more often with embolic rather than hemorrhagic or thrombotic stroke. Chronic seizures are associated with all forms of stroke.

304 Seizure disorder is not "idiopathic" in which of the following age groups ?

Harrison's 18th Ed. 3256 Table 369-4

- A. Neonatal period (<1 month)
- B. Infants and children (>1 month and <12 years)
- C. Adolescents (12 - 18 years)
- D. Young adults (18 - 35 years)

305 Hypocalcemia or hypomagnesemia are a cause of seizure disorder in which of the following age groups ?

Harrison's 18th Ed. 3256 Table 369-4

- A. Neonatal period (<1 month)
- B. Infants and children (>1 month and <12 years)
- C. Adolescents (12 - 18 years)
- D. Young adults (18 - 35 years)

306 Which of the following bronchodilators cause epilepsy ?

Harrison's 18th Ed. 3257 Table 369-5

- A. Theophylline
- B. Salbutamol
- C. Terbutaline
- D. Ipratropium bromide

307 Which of the following anti-tubercular drug cause epilepsy ?

Harrison's 18th Ed. 3257 Table 369-5

- A. Isoniazid
- B. Rifampin
- C. Pyrazinamide
- D. Ethambutol

308 Which of the following analgesics can cause epilepsy ?

Harrison's 18th Ed. 3257 Table 369-5

- A. Aspirin
- B. Diclofenac sodium
- C. Tramadol
- D. Nimusilide

309 Which of the following antimicrobial / antiviral can cause epilepsy ?

Harrison's 18th Ed. 3257 Table 369-5

- A. Quinolones
- B. Acyclovir
- C. Ganciclovir
- D. All of the above

310 Which of the following antimalarials can cause seizure ?

Harrison's 18th Ed. 3257 Table 369-5

- A. Mefloquine
- B. Quinine
- C. Artemether
- D. Halofantrine

Antimalarials - chloroquine and mefloquine can cause seizure.

311 Diseases due to ion-channel mutations "channelopathies" include ?

N Engl J Med 2003;349:1257-66

- A. Episodic ataxia
- B. Familial hemiplegic migraine
- C. Long-QT syndrome
- D. All of the above

Ion-channel mutations "channelopathies" are characterized by paroxysmal episodes of neurologic or cardiac dysfunction, include episodic ataxia, periodic paralysis, familial hemiplegic migraine, and the long-QT syndrome.

312 The initial bursting activity in seizure is caused by ?

Harrison's 18th Ed. 3256

- A. Influx of extracellular calcium (Ca^{2+})
- B. Opening of voltage-dependent sodium (Na^+) channels
- C. Gamma-aminobutyric acid (GABA) receptors
- D. All of the above

313 Hyperpolarizing afterpotential during seizure is mediated by ?*Harrison's 18th Ed. 3257*

- A. Influx of extracellular calcium (Ca^{2+})
- B. Opening of voltage-dependent sodium (Na^+) channels
- C. Gamma-aminobutyric acid (GABA) receptors
- D. All of the above

Focal seizure activity can begin in a very discrete region of cortex and then spread to neighboring regions, i.e., there is a seizure initiation phase and a seizure propagation phase. The initiation phase is characterized by two concurrent events in an aggregate of neurons: (1) high-frequency bursts of action potentials and (2) hypersynchronization. The bursting activity is caused by a relatively long-lasting depolarization of the neuronal membrane due to influx of extracellular calcium (Ca^{2+}), which leads to the opening of voltage-dependent sodium (Na^+) channels, influx of Na^+ , and generation of repetitive action potentials. This is followed by a hyperpolarizing afterpotential mediated by gamma-aminobutyric acid (GABA) receptors or potassium (K^+) channels, depending on cell type.

314 Which of the following is a co-agonist of glutamate at the NMDA receptor ?

- A. Tyrosine
- B. Glycine
- C. L-tryptophan
- D. Arginine

Glycine is a co-agonist of glutamate at the (N-methyl D-aspartate) NMDA receptor. NMDA glutaminergic receptors are excitatory.

315 Which of the following about gamma-aminobutyric acid (GABA) is false ?

- A. GABA is an inhibitory neurotransmitter in adult CNS
- B. GABA_A receptors are located postsynaptically
- C. GABA_B receptors are located presynaptically
- D. None of the above

316 Which of the following is a precipitant of epilepsy ?*Harrison's 18th Ed. 3255, 3257*

- A. Psychological or physical stress
- B. Sleep deprivation
- C. Hormonal changes with menstrual cycle
- D. All of the above

Precipitating factors of epilepsy include sleep deprivation, fever, hypoxia, systemic diseases, electrolyte or metabolic derangements, acute infection, drugs that lower the seizure threshold, or alcohol or illicit drug use/withdrawal.

317 Pronator drift is an indicator of ?*Harrison's 18th Ed. 3258*

- A. Lower motor neuron weakness
- B. Upper motor neuron weakness
- C. Muscle wasting
- D. Sensory neuropathy

Pronator drift is a pathologic sign and indicates UMN type weakness. Person is asked to extend arms by 90 degrees, supinate forearms, close eyes and hold the position. If a forearm pronates then the person is said to have pronator drift on that side.

318 Antiepileptic drug that acts by potentiation of GABA receptor function is ?*Harrison's 18th Ed. 3258*

- A. Phenytoin
- B. Lamotrigine
- C. Benzodiazepine
- D. Valproic acid

319 Antiepileptic drug that acts by increasing the availability of GABA is ?*Harrison's 18th Ed. 3258*

- A. Phenytoin
- B. Lamotrigine
- C. Benzodiazepine
- D. Valproic acid

320 Antiepileptic drug that acts by increasing the availability of GABA is ?*Harrison's 18th Ed. 3258*

- A. Tiagabine
- B. Valproic acid
- C. Gabapentin
- D. All of the above

321 Antiepileptic drug that acts by decreasing glutamate release is ?*Harrison's 18th Ed. 3258*

- A. Phenytoin
- B. Lamotrigine
- C. Benzodiazepine
- D. Valproic acid

322 Antiepileptic drug that acts by inhibiting voltage-gated Ca^{++} channels is ?*Harrison's 18th Ed. 3258*

- A. Phenytoin
- B. Lamotrigine
- C. Benzodiazepine
- D. Valproic acid

Antiepileptic drugs that act by inhibiting Na^+ dependent action potentials are phenytoin, carbamazepine, lamotrigine, topiramate & zonisamide. One that acts by inhibiting voltage-gated Ca^{++} channels is phenytoin while lamotrigine acts by decreasing glutamate release. Benzodiazepines & barbiturates potentiate GABA receptor function, while valproic acid, gabapentin & tiagabine increase availability of GABA. Ethosuximide & valproic acid act by inhibiting T-type Ca^{++} channels in thalamic neurons.

323 Which of the following is a part of hippocampus ?

- A. Subiculum
- B. Ammon's horn
- C. Dentate gyrus
- D. All of the above

324 Which of the following is a part of Ammon's horn ?

- A. CA1
- B. CA2
- C. CA3
- D. All of the above

Hippocampus consists of 3 major regions: subiculum, hippocampus proper (Ammon's horn) & dentate gyrus. Hippocampus & dentate gyrus have a three layered cortex. Subiculum is the transition zone from the three to six layered cortex. Important regions of hippocampus proper include CA1, CA2, CA3.

325 Which of the following is a glutamate receptor ?

- A. AMPA
- B. Kainate (Ka)
- C. NMDA
- D. All of the above

Major excitatory neurotransmitter is amino acid glutamate. Glutamate receptors are postsynaptic. Ionotropic subclasses are alpha-amino-2,3-dihydro-5-methyl-3-oxo-4-isoxazolepropanoic acid (AMPA), kainate receptors (Ka) & N-methyl-D-aspartate (NMDA). These allow ion influx upon activation by glutamate.

- 326 **Antagonists to which of the following glutamate receptor suppresses seizure activity ?**
- A. AMPA
 - B. Kainate (Ka)
 - C. NMDA
 - D. All of the above

NMDA, AMPA & kainate agonists induce seizure activity, whereas their antagonists suppress seizure activity.

- 327 **Which of the following is a GABA_B agonist ?**
- A. Baclofen
 - B. Barbiturate
 - C. Benzodiazepine
 - D. All of the above

GABA_A receptor agonists are barbiturates and benzodiazepines. They suppress seizure activity. GABA_B receptors agonist is baclofen and exacerbates hyperexcitability and seizures.

- 328 **In EEG, rhythmic activity of vertically oriented pyramidal cells of cerebral cortex normally recorded represents ?**
- Harrison's 18th Ed. Chapter e45*
- A. Presynaptic potentials
 - B. Postsynaptic potentials
 - C. Difference of Pre- and Postsynaptic potentials
 - D. None of the above

The rhythmic activity normally recorded represents the postsynaptic potentials of vertically oriented pyramidal cells of the cerebral cortex.

- 329 **In EEG, which of the following rhythm is faster than alpha rhythm ?**
- Harrison's 18th Ed. Chapter e45*
- A. Beta
 - B. Theta
 - C. Delta
 - D. All of the above

EEG waveforms are divided into four major frequency bands: delta (0-3+ Hz), theta (4-7+ Hz), alpha (8-13 Hz), and beta (>14 Hz). They are named in Greek order of historical discovery rather than low to high frequency numbers. Muscle artifact is high amplitude irregular activity, usually in the frequency range of about 20-50 Hz.

- 330 **Out of the following, which is the slowest frequency in EEG ?**
- Harrison's 18th Ed. Chapter e45*
- A. Alpha
 - B. Beta
 - C. Theta
 - D. Delta

- 331 **“Posterior dominant rhythm” is also called ?**
- Harrison's 18th Ed. Chapter e45*
- A. Alpha rhythm
 - B. Beta rhythm
 - C. Theta rhythm
 - D. Delta rhythm

A symmetrical rhythm is observed over the posterior head regions during relaxed wakefulness with eyes closed, that undergoes amplitude attenuation with eye opening or mental alerting activities. It is called the posterior dominant rhythm or alpha rhythm, as in adults it has a frequency of 8-13 Hz. Alpha rhythm is also called Berger rhythm.

- 332 **Which rhythm produces an underlying undulation of EEG ?**
- A. Alpha rhythm
 - B. Beta rhythm
 - C. Theta rhythm
 - D. Delta rhythm

Delta activity produces an underlying undulation of EEG. Riding on top of delta activity may be frequencies in the other bands, such as components of alpha & high frequency “jittery” activity in the beta range.

- 333 **In EEG, calibration marker shows what level of voltage as standard ?**
- A. 1 microvolt
 - B. 10 microvolt
 - C. 100 microvolt
 - D. 1000 microvolt

Each EEG channel is a record of voltage over time. The calibration marker shows one second and 100-microvolt standards.

- 334 **Normal EEG background voltages are in the range of ?**
- A. 10 - 20 microvolts
 - B. 20 - 50 microvolts
 - C. 30 - 100 microvolts
 - D. 40 - 150 microvolts

Normal EEG background voltages are in the range of 30-100 microvolts.

- 335 **Which of the following about alpha rhythm is false ?**
- A. Most prominent when subject is quietly relaxed with eyes closed, but not asleep
 - B. Waxing and waning
 - C. Higher on right side of the brain
 - D. None of the above

Alpha rhythm is 8 and 12 Hz, waxing and waning, with a posterior maximum, (parieto-occipital). It can spread into any electrodes of 10-20 system except Fp1 & Fp2. It is most prominent when subject is quietly relaxed with eyes closed, but not asleep. Alpha rhythm usually is higher on right side of brain.

- 336 **Which of the following medications increase β activity in EEG ?**
- A. Barbiturates
 - B. Benzodiazepines
 - C. Chloral hydrate
 - D. All of the above

Beta activity is a fast rhythm of 13 per second and greater, is visualized on the EEG as a “jitteriness” of the trace. Barbiturates, benzodiazepines and chloral hydrate increase beta activity.

- 337 **In EEG, which of the following signifies an encephalopathy ?**
- A. Localized slow frequency
 - B. Localized fast frequency
 - C. Diffuse slow frequency
 - D. Diffuse fast frequency

Alterations of brain function results in abnormal slow frequency activity in EEG. Diffuse slow activity signifies an encephalopathy.

338 In EEG, which of the following suggest epileptiform activity ?

- A. Spikes
- B. Sharp waves
- C. Spike-wave complexes
- D. Any of the above

Epileptiform activity characteristic of epilepsy includes spikes, sharp waves and spike-wave complexes.

339 Each EEG electrode can detect synchronous activity generated by how much area of surface cerebral cortex ?

- A. ~ 3 sq. cm.
- B. ~ 6 sq. cm.
- C. ~ 9 sq. cm.
- D. ~ 12 sq. cm.

Each EEG electrode can detect synchronous activity generated by ~ 6 sq. cm. of cortex.

340 Usually, EEG is performed after how many hours after a seizure episode ?

N Engl J Med 2001;344:1146

- A. 6 hours
- B. 12 hours
- C. 24 hours
- D. 48 hours

341 EEG should include recordings during ?

N Engl J Med 2001;344:1146

- A. Sleep
- B. Photic stimulation
- C. Hyperventilation
- D. All of the above

It is customary to perform EEG 48 hours or more after a suspected seizure, because EEG shortly after a seizure may give misleading findings. To provoke abnormalities, EEG should be recorded during sleep, sleep deprivation, photic stimulation, and hyperventilation (Activating procedures).

342 Which of the following about EEG is false ?

Harrison's 18th Ed. 3260

- A. Presence of epileptiform activity is not specific for epilepsy
- B. In epileptic, initial interictal EEG is normal in ~ 60%
- C. A normal EEG implies a better prognosis
- D. None of the above

343 Which of the following is useful in the evaluation of a patient with epilepsy ?

Harrison's 18th Ed. 3260

- A. FLAIR
- B. SPECT
- C. PET
- D. All of the above

FLAIR has increased sensitivity for detection of abnormalities of cortical architecture. Positron emission tomography (PET) & single photon emission computed tomography (SPECT) are used to evaluate patients with medically refractory seizures.

344 FLAIR stands for ?

Harrison's 18th Ed. 3260

- A. Fluid-attenuated inversion radiation
- B. Fluid-augmented inversion radiography

C. Fluid-attenuated inversion radiography

D. Fluid-attenuated inversion recovery

345 Electroencephalographic silence is observed in ?

Harrison's 18th Ed. Chapter e45

- A. Irreversible brain damage
- B. Hypothermia
- C. Drug overdose
- D. All of the above

In electroencephalographic silence, there is a reduction in amplitude of EEG until activity cannot be detected. It happens in irreversible brain damage, hypothermic patients or with drug overdose.

346 In visual evoked potentials (VEPs), the component of major clinical importance is ?

Harrison's 18th Ed. Chapter e45

- A. P100 response
- B. P200 response
- C. P300 response
- D. P400 response

Visual evoked potentials (VEPs) are elicited by monocular stimulation with a reversing checkerboard pattern and are recorded from the occipital region in the midline and on either side of scalp. The component of major clinical importance is P100 response, a positive peak having a latency of approximately 100 ms.

347 VEPs are most useful in detecting dysfunction of visual pathways at the level ?

Harrison's 18th Ed. Chapter e45

- A. Anterior to optic chiasm
- B. Optic chiasm
- C. Optic radiation
- D. Visual cortex

VEPs are most useful in detecting dysfunction of the visual pathways anterior to the optic chiasm. In acute severe optic neuritis, P100 is frequently lost or grossly attenuated and as clinical recovery occurs and visual acuity improves, P100 is restored. VEP findings are helpful in indicating previous or subclinical optic neuritis. In cortical blindness, VEPs may be normal. Multifocal VEP is likely to be more sensitive than routine VEP.

348 Factors associated with a high risk of recurrent seizures include all except ?

Harrison's 15th Ed. Chapter 360

- A. Known structural lesion
- B. EEG abnormalities
- C. Onset of seizure disorder during childhood
- D. Seizures that require more than one antiepileptic drug

349 Which of the following statements is false about EEG ?

Harrison's 18th Ed. Chapter e45

- A. Normal EEG shows posteriorly situated 8-13 Hz α rhythm
- B. Alpha rhythm attenuates with eye opening
- C. Right-sided placements are indicated by even numbers, left-sided placements by odd numbers
- D. Midline placements are indicated by M

Right-sided electrode placements are indicated by even numbers, left-sided placements by odd numbers, and midline placements by Z.

350 Delta activity in EEG is seen in which stage of Hepatic Encephalopathy ?

Harrison's 16th Ed. 1868

- A. Stage I

- B. Stage II
- C. Stage III
- D. Stage IV

Hepatic encephalopathy is associated with triphasic waves.

351 In EEG, periodic lateralized epileptiform discharges (PLEDs) is typical of ?
Harrison's 16th Ed. 1868

- A. Subacute sclerosing panencephalitis (SSPE)
- B. Herpes simplex encephalitis
- C. Jakob-Creutzfeldt disease
- D. Hepatic encephalopathy

In EEG, periodic lateralized epileptiform discharges (PLEDs) is typical of herpes simplex encephalitis.

352 The specific order of electrode pairs is called ?

- A. Montage
- B. Prelage
- C. Consure
- D. Primark

The specific order of electrode pairs is called a montage.

353 Which of the following statements about therapeutic range of antiepileptic drugs is false ?
Harrison's 16th Ed. 2368

A. Carbamazepine	15 - 20 µg/ml
B. Valproic acid	50 - 150 µg/ml
C. Phenytoin	10 - 20 µg/ml
D. Phenobarbital	10 - 40 µg/ml

Therapeutic range of Carbamazepine is 4–12 µg/ml. Ethosuximide 40–120 µg/ml, Primidone 5–12 µg/ml. Therapeutic range for Gabapentin, Lamotrigine, Levetiracetam, Oxcarbazepine is not established.

354 Estimation of which of the following helps to distinguish between organic and psychogenic seizures ?
Harrison's 18th Ed. 3261

- A. Serum insulin levels
- B. Serum growth hormone levels
- C. Serum prolactin levels
- D. Serum vasopressin levels

Most generalized seizures and many complex partial seizures are accompanied by rises in serum prolactin during the immediate 30 minute postictal period, whereas psychogenic seizures are not. Peripheral WBC count also increase significantly after a generalized seizure.

355 "Reflex epilepsy" best relates to ?
Harrison's 18th Ed. 3262

- A. Alcohol intake
- B. Sleep deprivation
- C. Specific music or an individual's voice
- D. Physical exertion

Seizures that are induced by highly specific stimuli such as a video game monitor, music, or an individual's voice are categorized as "reflex epilepsy".

356 Risk factors associated with recurrent seizures include ?
Harrison's 18th Ed. 3262

- A. Abnormal neurologic examination
- B. Seizures presenting as status epilepticus

- C. Abnormal EEG
- D. All of the above

Risk factors associated with recurrent seizures include an abnormal neurologic examination, seizures presenting as status epilepticus, postictal Todd's paralysis, strong family history of seizures, an abnormal EEG.

357 Which of the following is the first-line medication in focal seizures ?
Harrison's 18th Ed. 3262 Table 369-8

- A. Valproic acid
- B. Lamotrigine
- C. Carbamazepine
- D. Ethosuximide

358 Which of the following is the first-line medication in typical absence seizures ?
Harrison's 18th Ed. 3262 Table 369-8

- A. Valproic acid
- B. Lamotrigine
- C. Carbamazepine
- D. Ethosuximide

359 Which of the following is the first-line medication in atypical absence seizures ?
Harrison's 18th Ed. 3262 Table 369-8

- A. Valproic acid
- B. Lamotrigine
- C. Carbamazepine
- D. Ethosuximide

360 Which of the following is the first-line medication in myoclonic seizures ?
Harrison's 18th Ed. 3262 Table 369-8

- A. Valproic acid
- B. Lamotrigine
- C. Carbamazepine
- D. Ethosuximide

361 Which of the following is not a first-line medication in seizures ?
Harrison's 18th Ed. 3262 Table 369-8

- A. Valproic acid
- B. Lamotrigine
- C. Carbamazepine
- D. Gabapentin

362 Which of the following anti-epileptic drugs is preferred in Lennox-Gastaut syndrome ?
Harrison's 18th Ed. 3262 Table 369-9

- A. Phenobarbital
- B. Valproic acid
- C. Gabapentin
- D. Lamotrigine

Anti-epileptic drugs useful in Lennox-Gastaut syndrome include Lamotrigine, Topiramate, Felbamate, Rufinamide. Corpus callosotomy has been shown to be effective for disabling tonic or atonic seizures, usually when they are part of a mixed-seizure syndrome (e.g., Lennox-Gastaut syndrome).

363 Which of the following anti-epileptic drugs does not have significant drug interactions ?

Harrison's 18th Ed. 3262 Table 369-9

- A. Phenobarbital
- B. Valproic acid
- C. Gabapentin
- D. Lamotrigine

364 Most recurrences of epilepsy occur how many months after discontinuing therapy ?

Harrison's 17th Ed. 2510

- A. 3 months
- B. 4 months
- C. 5 months
- D. 6 months

Most recurrences occur in the first 3 months after discontinuing therapy.

365 Which of the following anti-epileptic medications have enzyme-inducing effects ?

Harrison's 18th Ed. 3269, 3264 Table 369-9

- A. Phenytoin
- B. Phenobarbital
- C. Primidone
- D. All of the above

Enzyme-inducing anti-epileptic drugs (phenytoin, carbamazepine, oxcarbazepine, topiramate, phenobarbital, and primidone) cause a transient and reversible deficiency of vitamin K-dependent clotting factors in about 50% of newborn infants.

366 Carbamazepine and phenytoin are contraindicated in which of the following epilepsies ?

Harrison's 18th Ed. 3266, N Engl J Med 1999;340:1565

- A. Juvenile myoclonic epilepsy (JME)
- B. Absence seizures
- C. Myoclonic seizures
- D. All of the above

Carbamazepine, oxcarbazepine, and phenytoin can worsen certain types of generalized seizures, including absence, myoclonic, tonic, and atonic seizures.

367 Which of the following is the adverse effect of carbamazepine ?

Harrison's 18th Ed. 3262

- A. Leukopenia
- B. Aplastic anemia
- C. Hepatotoxicity
- D. All of the above

Carbamazepine can cause leukopenia, aplastic anemia, or hepatotoxicity

368 Treatment of choice for juvenile myoclonic epilepsy is ?

N Engl J Med 1999;340:1565

- A. Valproic acid
- B. Lamotrigine
- C. Acetazolamide
- D. Topiramate

Valproic acid is the treatment of choice for juvenile myoclonic epilepsy, but lamotrigine, clonazepam, acetazolamide, primidone & topiramate are useful.

369 Which of the following anti-epileptic medications rarely cause skin rashes ?

Harrison's 17th Ed. 2507

- A. Gabapentin
- B. Divalproex sodium
- C. Levetiracetam
- D. All of the above

370 Which of the following anti-epileptic drug causes skin rashes ?

Harrison's 18th Ed. 3262

- A. Gabapentin
- B. Divalproex sodium
- C. Levetiracetam
- D. Lamotrigine

Lamotrigine causes skin rash during initiation of therapy. This can be extremely severe and lead to Stevens-Johnson syndrome if unrecognized and if the medication is not discontinued immediately.

371 What percentage of patients with epilepsy do not respond to treatment with a single antiepileptic drug ?

Harrison's 18th Ed. 3266

- A. ~ one-fourth
- B. ~ one-third
- C. ~ one-half
- D. ~ two-third

About one-third of epileptic patients do not respond to treatment with a single antiepileptic drug.

372 Most common surgical procedure for patients with temporal lobe epilepsy involves resection of ?

Harrison's 18th Ed. 3267

- A. Anteromedial temporal lobe
- B. Anterolateral temporal lobe
- C. Posteromedial temporal lobe
- D. Posterolateral temporal lobe

Most common surgical procedure for temporal lobe epilepsy is resection of anteromedial temporal lobe.

373 During pregnancy, seizure frequency decreases in what percentage of women ?

Harrison's 18th Ed. 3269

- A. 10 %
- B. 20 %
- C. 30 %
- D. 40 %

During pregnancy, seizure frequency will remain unchanged in ~50% of women, increase in 30%, and decrease in 20%.

374 Which of the following anti-epileptic medications can significantly antagonize effects of oral contraceptives ?

Harrison's 18th Ed. 3269

- A. Carbamazepine
- B. Phenytoin
- C. Topiramate
- D. All of the above

Carbamazepine, phenytoin, phenobarbital, and topiramate can significantly antagonize the effects of oral contraceptives via enzyme induction.

- 375 Ratio of drug concentration in breast milk relative to serum is maximum with which of the following antiepileptic drug ?

Harrison's 16th Ed. 2372

- A. Ethosuximide
- B. Phenobarbital
- C. Carbamazepine
- D. Phenytoin

- 376 Ratio of drug concentration in breast milk relative to serum is minimum with which of the following antiepileptic drug ?

Harrison's 16th Ed. 2372

- A. Valproic acid
- B. Phenobarbital
- C. Carbamazepine
- D. Phenytoin

Ratio of drug concentration in breast milk relative to serum is ~80% for ethosuximide, 40–60% for phenobarbital, 40% for carbamazepine, 15% for phenytoin, and 5% for valproic acid.

- 377 One of the most specific signs of a metabolic encephalopathy is ?

Harrison's 16th Ed. 1624

- A. Bilateral Asterixis
- B. Confusion
- C. Seizure
- D. Vomiting

- 378 Asterixis can be found in ?

Harrison's 16th Ed. 1624

- A. Any tonically held posture
- B. Tonically held tongue
- C. Voluntary limb motion
- D. All of the above

- 379 In an awake patient of uremic encephalopathy, the typical movement abnormality is ?

Harrison's 16th Ed. 1625

- A. Myoclonic jerking and tremor
- B. Partial seizure
- C. Primary generalized seizure
- D. Absence seizure

- 380 Typical movement abnormality seen with use of antipsychotic drugs such as lithium, phenothiazines, or butyrophenones is ?

Harrison's 16th Ed. 1625

- A. Myoclonic jerking and tremor
- B. Partial seizure
- C. Primary generalized seizure
- D. Absence seizure

- 381 Which of the following statements about status epilepticus is false ?

Harrison's 18th Ed. 3267

- A. Continuous seizures
- B. Repetitive, discrete seizures
- C. Impaired consciousness in the interictal period
- D. May be nonconvulsive

Status epilepticus refers to continuous seizures or repetitive, discrete seizures with impaired consciousness in the interictal period. Its subtypes include generalized convulsive status epilepticus (GCSE) and nonconvulsive status epilepticus (persistent absence seizures or focal seizures).

- 382 In generalized convulsive status epilepticus (GCSE), which of the following leads to irreversible neuronal injury ?

Harrison's 18th Ed. 3268

- A. Cardiorespiratory dysfunction
- B. Hyperthermia
- C. Metabolic derangements
- D. All of the above

- 383 Which of the following is the first medicine that is recommended for generalized tonic-clonic status epilepticus in adults ?

Harrison's 18th Ed. 3268 Figure 369-3

- A. Lorazepam
- B. Fosphenytoin
- C. Valproate
- D. Phenobarbital

Lorazepam is recommended for generalized tonic-clonic status epilepticus in adults in doses of 0.1 - 0.15 mg/kg IV over 1 - 2 minutes to be repeated once if no response is obtained after 5 minutes.

- 384 Which of the following is the effect of selective serotonin reuptake inhibitors (SSRIs) on seizures ?

Harrison's 18th Ed. 3268

- A. Increase seizure frequency
- B. Decrease seizure frequency
- C. No effect
- D. Any of the above

Selective serotonin reuptake inhibitors (SSRIs) typically have no effect on seizures. High doses of tricyclic antidepressants may lower the seizure threshold.

- 385 Which of the following is false about "Sudden unexpected death in epileptic patients (SUDEP) ?

Harrison's 18th Ed. 3268

- A. Affects young people with convulsive seizures
- B. Tends to occur at night
- C. May result from brainstem-mediated effects of seizures on cardiac rhythms or pulmonary function
- D. None of the above

Sudden unexpected death in epileptic patients (SUDEP) affects young people with convulsive seizures and tends to occur at night. It may result from brainstem-mediated effects of seizures on cardiac rhythms or pulmonary function.

- 386 Which of the following drug is effective as adjunctive therapy in catamenial epilepsy ?

Harrison's 17th Ed. 2512

- A. Prednisolone
- B. Beta blockers
- C. Acetazolamide
- D. Diuretics

There may be an increase in seizure frequency around menses due to effects of estrogen or progesterone on neuronal excitability or changes in antiepileptic drug levels due to altered protein binding. Acetazolamide (250-500 mg/d) may be effective as adjunctive therapy when started 7-10 days before menses.

Chapter 370. Cerebrovascular Diseases

Ischemic stroke

387 By definition, neurologic signs and symptoms of TIA last for less than ?

Harrison's 18th Ed. 3270

- A. < 1 hour
- B. < 6 hours
- C. < 12 hours
- D. < 24 hours

Typically the neurologic signs and symptoms of a TIA last for 5 to 15 minutes but, by definition, must last for <24 hours. Newly proposed definition classifies those with new brain infarction as ischemic strokes regardless of whether symptoms persist.

388 Focal brain ischemia or infarction is usually caused by ?

Harrison's 18th Ed. 3270

- A. Thrombosis of cerebral vessels
- B. Emboli from a proximal arterial source
- C. Emboli from the heart
- D. All of the above

Focal brain ischemia or infarction is caused by thrombosis of cerebral vessels or by emboli from a proximal arterial source or heart.

389 The average duration of a TIA is ?

Harrison's 16th Ed. 2379

- A. ~ 1 minute
- B. ~ 12 minutes
- C. ~ 35 minutes
- D. ~ 56 minutes

The average duration of a TIA is ~12 minutes.

390 Brain infarction occurs in what percentage of TIAs even when neurologic signs and symptoms are absent ?

Harrison's 18th Ed. 3280

- A. 1 - 5 %
- B. 3 - 20 %
- C. 10 - 20 %
- D. 15 - 50 %

Even in absence of neurologic signs & symptoms, infarcts of brain occur in 15 - 50% of TIAs.

391 In the first 3 months after TIA, risk of stroke is ?

Harrison's 18th Ed. 3280

- A. ~ 10 - 15 %
- B. ~ 20 - 35 %
- C. ~ 40 - 60 %
- D. ~ 60 - 85 %

Risk of stroke after TIA is ~10 - 15% in first 3 months, with most events occurring in first 2 days.

392 Which of the following estimates risk of stroke following TIA ?

Harrison's 18th Ed. 3280 Table 370-5

- A. ABCD Score
- B. SAPS II Score

- C. IPI score
- D. Modified Child-Pugh classification

APACHE (acute physiology and chronic health evaluation) system and SAPS (simplified acute physiology score) system are severity-of-illness (SOI) scoring systems. International Prognostic Index (IPI) is for NHL. Modified Child-Pugh classification is a staging system for cirrhosis.

393 Which of the following is not a part of ABCD Scoring system for TIA ?

Harrison's 18th Ed. 3280 Table 370-5

- A. Age
- B. Sex
- C. Hypertension
- D. Diabetes

ABCD Scoring system for TIA includes age, blood pressure (SBP & DBP), clinical symptoms (unilateral weakness, speech disturbance without weakness), duration and diabetes.

394 Amaurosis Fugax is best related to ?

Harrison's 18th Ed. 230

- A. Cluster headache
- B. Transient ischemic attack of retina
- C. Hysterical conversion reaction
- D. All of the above

Amaurosis fugax or a transient ischemic attack of the retina or transient monocular blindness, occurs from emboli to central retinal artery of one eye indicating carotid stenosis or local ophthalmic artery disease as the cause.

395 Amaurosis Fugax is the result of ?

Harrison's 18th Ed. 230

- A. Trauma
- B. Emboli
- C. Vascular spasm
- D. Any of the above

Amaurosis fugax usually results from an embolus stuck in a retinal arteriole. Complete occlusion of the central retinal artery produces arrest of blood flow and a milky retina with a cherry-red fovea.

396 Emboli causing amaurosis fugax are composed of ?

Harrison's 18th Ed. 230

- A. Cholesterol
- B. Calcium
- C. Platelet-fibrin debris
- D. Any of the above

Emboli causing amaurosis fugax are composed of cholesterol (Hollenhorst plaque), calcium, or platelet-fibrin debris. Most common source is atherosclerotic plaque in carotid artery or aorta.

397 Which of the following statements about amaurosis fugax is false ?

Harrison's 18th Ed. 231

- A. Briefer duration than migraine
- B. Occurs in both eyes
- C. Not followed by headache
- D. Associated with antiphospholipid antibody syndrome

Amaurosis fugax occurs in only one eye (painless monocular loss of vision). It can be a part of high-altitude neurologic events.

398 Most neurologic events occur within what duration after a TIA ?

Harrison's 18th Ed. 3280

- A. First 2 days

- B. First 7 days
- C. First 15 days
- D. First 30 days

Most neurologic events occur in first 2 days after TIA. Risk of stroke is ~10% in first 3 months.

399 Conditions that may mimic stroke include ?

Harrison's 18th Ed. 3270, N Engl J Med 2000;343:710

- A. Hypoglycemia
- B. Hypertensive encephalopathy
- C. Migraine
- D. All of the above

Conditions that may mimic stroke include hypoglycemia, seizures, brain tumor, hypertensive encephalopathy, migraine & metabolic encephalopathy.

400 A fall in cerebral blood flow to zero causes death of brain tissue within ?

Harrison's 18th Ed. 3271

- A. 30 seconds to 1 minute
- B. 1 to 4 minutes
- C. 4 to 10 minutes
- D. 10 to 15 minutes

A fall in cerebral blood flow to zero causes death of brain tissue within 4 to 10 minutes.

401 When cerebral blood flow falls to <16 to 18 mL/100 gram per minute, how long would it take for brain infarction ?

Harrison's 18th Ed. 3271

- A. 1 hour
- B. 2 hour
- C. 3 hour
- D. 4 hour

When cerebral blood flow falls to <16 - 18 mL/100 gram/minute, brain infarction occurs in 1 hour.

402 Which of the following is false about ischemic penumbra ?

Harrison's 18th Ed. 3271

- A. Ischemic tissue around core region of infarction
- B. Reversibly dysfunctional
- C. Imaged by perfusion-diffusion imaging with MRI
- D. None of the above

In ischemic penumbra, cellular death occurs by apoptosis days to weeks later. Saving the ischemic penumbra is the goal of revascularization therapies.

403 In MRI, which of the following is a measure of ischemic penumbra ?

Harrison's 18th Ed. 3295 Figure 370-16

- A. Perfusion defect
- B. Diffusion deficit
- C. Diffusion-perfusion mismatch
- D. All of the above

The discrepancy between the region of poor perfusion and diffusion deficit is called diffusion-perfusion mismatch and is a measure of ischemic penumbra.

404 Which of the following favour the diagnosis of cerebral hemorrhage rather than ischemia ?

Harrison's 18th Ed. 3271

- A. Lower initial blood pressure

- B. Higher initial blood pressure
- C. Fluctuating blood pressure
- D. Any of the above

A more depressed level of consciousness, higher initial blood pressure, or worsening of symptoms after onset favor hemorrhage, and a deficit that remits suggests ischemia.

405 "Ischemic penumbra" is located at ?

Harrison's 18th Ed. 3271

- A. Center of the core region of infarction
- B. Within the core region of infarction
- C. Surrounding the core region of infarction
- D. Any of the above

Tissue surrounding the core region of infarction is ischemic but reversibly dysfunctional and is called as the ischemic penumbra.

406 If no improvement in cerebral flow occurs, what will happen to ischemic penumbra ?

Harrison's 18th Ed. 3271

- A. Will improve
- B. Will infarct
- C. Will continue to remain the same
- D. Any of the above

The ischemic penumbra will eventually infarct if no change in flow occurs.

407 In ischemic penumbra, mechanism of cell death is ?

Harrison's 17th Ed. 2513

- A. Apoptosis
- B. Necrotic
- C. Mechanical
- D. Toxicity due to free radicals

In Ischemic penumbra, apoptotic cellular death occurs days to weeks later.

408 Events that can cause "secondary brain insults" include all except ?

Harrison's 16th Ed. 2374

- A. Systemic hypertension
- B. Hypoxia
- C. Seizures
- D. Hyperglycemia

Systemic hypotension & hypoxia reduce substrate delivery to vulnerable brain tissue. Fever, seizures & hyperglycemia can increase cellular metabolism. Clinically these events are known as secondary brain insults because they lead to exacerbation of the primary brain injury.

409 BP should not be lowered acutely in acute ischemic stroke because it affects blood flow in ?

Harrison's 18th Ed. 3272

- A. Cerebral arteries
- B. Cerebral veins
- C. Collateral channels
- D. All of the above

Because collateral blood flow within the ischemic brain is blood pressure dependent, blood pressure should not be lowered acutely.

410 In acute ischemic stroke, BP should be lowered if it is ?

Harrison's 18th Ed. 3272

- A. > 140 / 90 mm Hg

- B. > 150 / 100 mm Hg
- C. > 165 / 110 mm Hg
- D. > 185 / 110 mm Hg

In acute ischemic stroke, BP should be lowered if there is malignant hypertension, concomitant myocardial ischemia or if BP is >185/110 mm Hg or if thrombolytic therapy is anticipated.

411 In acute ischemic stroke, cerebral edema peaks on ?

Harrison's 18th Ed. 3272

- A. Day 1
- B. Day 2 - 3
- C. Day 4 - 5
- D. Day 5 - 6

In acute ischemic stroke, cerebral edema peaks on day 2 - 3 & cause mass effect for ~10 days.

412 The established dose of rtPA to be administered within 3 hours of acute ischemic stroke is ?

Harrison's 18th Ed. 3272

- A. 0.1 mg/kg
- B. 0.3 mg/kg
- C. 0.9 mg/kg
- D. 1.2 mg/kg

The National Institute of Neurological Disorders and Stroke (NINDS) recombinant tPA (rtPA) Stroke Study used IV rtPA (0.9 mg/kg to a 90-mg max; 10% as a bolus, then the remainder over 60 min) in patients with ischemic stroke within 3 hours of onset.

413 The time of acute ischemic stroke onset is defined as ?

Harrison's 18th Ed. 3273

- A. Time the patient's symptoms began
- B. Time the patient was last seen as normal
- C. Time to bed in those who awaken with stroke
- D. All of the above

Time of stroke onset is defined as the time patient's symptoms began or time patient was last seen as normal. A patient who awakens with stroke has the onset defined as when they went to bed.

414 Which of the following studied the value of thrombolytics via an intraarterial route in acute ischemic stroke ?

Harrison's 18th Ed. 3273

- A. PROACT II
- B. ECASS
- C. ATLANTIS
- D. NINDS

Prolyse in Acute Cerebral Thromboembolism (PROACT) II trial found benefit for intraarterial pro-urokinase for acute middle cerebral artery (MCA) occlusions up to 6th hour following onset of stroke.

415 In Chinese Acute Stroke Trial (CAST), dose of aspirin was ?

Harrison's 18th Ed. 3273

- A. 75 mg/day
- B. 160 mg/day
- C. 300 mg/day
- D. 625 mg/day

In CAST, patients with ischemic stroke received 160 mg/day of aspirin for up to 4 weeks.

416 TOAST trial investigated which of the following in acute ischemic stroke ?

Harrison's 18th Ed. 3274

- A. Low-molecular-weight heparin

- B. Unfractionated heparin
- C. Aspirin
- D. Glycoprotein IIb/IIIa

The U.S. Trial of Organon 10172 in Acute Stroke Treatment (TOAST), an investigational low-molecular-weight heparin, failed to show any benefit over aspirin. Use of subcutaneous unfractionated heparin versus aspirin was tested in International Stroke Trial (IST).

417 Neuroprotection is the concept related to ?

Harrison's 18th Ed. 3274

- A. Preventing reinfarction
- B. Prolonging brain's tolerance to ischemia
- C. Checking the risk factors
- D. All of the above

Neuroprotection refers to providing a treatment that prolongs brain's tolerance to ischemia.

418 Restraint therapy is best related to ?

Harrison's 18th Ed. 3274

- A. Checking the risk factors
- B. Checking the precipitating factors
- C. Recruiting unused neural pathways
- D. Avoiding psychological stress

Restraint therapy i.e. immobilizing unaffected side improves hemiparesis following stroke, suggesting that physical therapy can recruit unused neural pathways (reprogramming brain).

419 Emboli in 'Hollenhorst plaque' are composed of ?

Harrison's 18th Ed. 3274

- A. Cholesterol
- B. Calcium
- C. Platelet-fibrin debris
- D. Bacteria

American ophthalmologist Dr Robert Hollenhorst (1913-2008) who first described Hollenhorst plaque as a cholesterol embolus that originated from an atheromatous plaque in a more proximal vessel, usually internal carotid artery. It is a sign of severe atherosclerosis & is seen in a blood vessel of retina on ophthalmoscopy as a bright, glistening, refractile plaque at bifurcation of a retinal arteriole. These may break up & move, and may not be present at subsequent visits.

420 Todd's paresis is related to ?

Harrison's 16th Ed. 2374

- A. Seizure
- B. Brain tumor
- C. Migraine
- D. Metabolic encephalopathy

Seizure disorder may precede Todd's paresis.

421 Cerebral perfusion pressure (CPP) is defined as ?

Harrison's 18th Ed. 3293

- A. Systolic blood pressure - intracranial pressure
- B. Diastolic blood pressure - intracranial pressure
- C. Mean arterial pressure - intracranial pressure
- D. Mean arterial pressure (MAP) ÷ intracranial pressure

Cerebral perfusion pressure (CPP) is defined as the mean systemic arterial pressure (MAP) minus the intracranial pressure (ICP).

422 Which of the following is responsible for autoregulation of cerebral blood flow ?

Harrison's 16th Ed. 1632

- A. Stems of ACA, MCA, PCA

- B. Circle of Willis
- C. Microcirculation
- D. All of the above

Cerebral blood flow (CBF) remains relatively constant over a wide range of blood pressures due to physiologic autoregulation that occur in microcirculation.

423 Cerebral blood flow is principally influenced by all except ?

Harrison's 16th Ed. 1632

- A. Systemic blood pressure
- B. pH
- C. PCO_2
- D. PO_2

CBF is strongly influenced by systemic blood pressure, pH and PCO_2 . CBF increases with hypercapnia and acidosis and decreases with hypocapnia and alkalosis.

424 Volume of CSF within ventricles and surrounding the brain and spinal cord is about ?

Harrison's 16th Ed. 1632

- A. 50 mL
- B. 100 mL
- C. 150 mL
- D. 200 mL

425 Cerebral blood volume is about ?

Harrison's 16th Ed. 1632

- A. 50 mL
- B. 100 mL
- C. 150 mL
- D. 200 mL

About 150 mL of CSF is present within the ventricles and surrounding the brain and spinal cord. Cerebral blood volume is also ~150 mL.

426 "Histotoxic hypoxia" is produced by ?

Harrison's 18th Ed. 288

- A. Shock
- B. Asphyxiation
- C. Carbon monoxide poisoning
- D. Any of the above

Hypoxia produced by carbon monoxide and cyanide poisoning is termed histotoxic hypoxia.

427 Selective persistent memory deficits after brief cardiac arrest is due to injury to ?

Harrison's 16th Ed. 1634

- A. Cerebral cortex
- B. Basal ganglia
- C. Hippocampus
- D. Hypothalamus

Selective persistent memory deficits after brief cardiac arrest is due to injury to hippocampal CA1 neurons.

428 Which of the following convey a poor prognosis after a severe hypoxic-ischemic insult ?

Harrison's 16th Ed. 1634, 1635

- A. Myoclonic status epilepticus
- B. Absence of pupillary light reflex day 3 after injury

- C. Bilateral absence of somatosensory evoked response
- D. All of the above

Absence of pupillary light reflex or absence of a motor response to pain on day 3 following injury, bilateral absence of early cortical somatosensory evoked response (SSEPs) and myoclonic status epilepticus after a severe hypoxic-ischemic insult convey a poor prognosis.

429 What proportion of all ischemic strokes are due to cardioembolism ?

Harrison's 18th Ed. 3274

- A. ~ 10 %
- B. ~ 20 %
- C. ~ 30 %
- D. ~ 40 %

Cardioembolism is responsible for ~20% of all ischemic strokes.

430 What proportion of all ischemic strokes are due to carotid atherosclerosis ?

Harrison's 18th Ed. 3275

- A. ~ 10 %
- B. ~ 20 %
- C. ~ 30 %
- D. ~ 40 %

10% of ischemic stroke are due to carotid atherosclerosis.

431 What proportion of all strokes are due to small-vessel disease ?

Harrison's 18th Ed. 3276

- A. ~ 10 %
- B. ~ 20 %
- C. ~ 30 %
- D. ~ 40 %

Small-vessel strokes account for ~20% of all strokes.

432 Sudden onset of neurologic dysfunction in embolic stroke is usually maximum at ?

Harrison's 18th Ed. 3274

- A. Onset
- B. At 12 hours
- C. At 24 hours
- D. At 48 hours

Embolic strokes tend to be sudden in onset, with maximum neurologic deficit at the onset.

433 Which of the following vessels is infrequently involved in embolization from heart ?

Harrison's 18th Ed. 3274

- A. Anterior cerebral artery (ACA)
- B. Middle cerebral artery (MCA)
- C. Posterior cerebral artery (PCA)
- D. Branches of posterior cerebral artery

Emboli from heart most often lodge in MCA, the PCA, or one of their branches. Anterior cerebral artery (ACA) territory is involved infrequently.

434 Emboli of what size are large enough to occlude stem of MCA ?

Harrison's 18th Ed. 3274

- A. 0.5 - 1 mm
- B. 1 - 2 mm

- C. 2 - 3 mm
- D. 3 - 4 mm

Emboli of the size of 3 - 4 mm are large enough to occlude stem of MCA.

435

Which of the following is the most common cause of cerebral cardioembolism ?

Harrison's 18th Ed. 3274

- A. Rheumatic heart disease with atrial fibrillation
- B. Nonrheumatic atrial fibrillation
- C. Recent MI
- D. Mitral valve prolapse

Nonrheumatic atrial fibrillation is the most common cause of cerebral embolism. Others are mural thrombus, myocardial infarction, dilated cardiomyopathy, mitral stenosis, mechanical valve, bacterial endocarditis. Mitral valve prolapse is not a source of emboli unless prolapse is severe.

436

CHADS2 score is calculating risk of stroke in ?

Harrison's 18th Ed. 3277 Table 370-3

- A. Nonvalvular atrial fibrillation
- B. Mitral valve prolapse
- C. Patent foramen ovale
- D. Mechanical heart value

437

Maximum points in CHADS2 score is for ?

Harrison's 18th Ed. 3277 Table 370-3

- A. Age
- B. Hypertension
- C. Congestive heart failure
- D. Stroke or TIA

CHADS2 score is calculated by summing of points for age >75 years (1), hypertension (1), congestive heart failure (1), diabetes (1), and stroke or TIA (2).

438

Which of the following location of recent transmural myocardial infarction is mostly the source of cerebral emboli ?

Harrison's 18th Ed. 3275

- A. Anteroapical ventricular wall
- B. Inferior ventricular wall
- C. Posterior ventricular wall
- D. Lateral ventricular wall

Recent transmural MI involving anteroapical ventricular wall is a source of cerebral emboli.

439

Most common source of artery-to-artery embolic stroke is ?

Harrison's 18th Ed. 3275

- A. Aortic arch
- B. Carotid bifurcation
- C. Common carotid
- D. Vertebral arteries

Carotid bifurcation atherosclerosis is the most common source of artery-to-artery embolus.

440

NASCET and ECST trials advocate carotid endarterectomy when carotid artery stenosis is more than ?

Harrison's 18th Ed. 3282

- A. 30 %
- B. 50 %
- C. 70 %
- D. 90 %

North American Symptomatic Carotid Endarterectomy Trial (NASCET) & European Carotid Surgery Trial (ECST) showed benefit for carotid endarterectomy when stenosis of >70%.

441

Carotid endarterectomy is most beneficial within how many weeks of symptom onset ?

Harrison's 18th Ed. 3283

- A. 2 weeks
- B. 4 weeks
- C. 6 weeks
- D. 8 weeks

Carotid endarterectomy is most beneficial when performed within 2 weeks of symptom onset. Benefits more men than women and those >75 years.

442

The underlying pathology in lacunar stroke is ?

Harrison's 18th Ed. 3276, 3279

- A. Congenital anomaly
- B. Embolism
- C. Lipohyalinosis
- D. All of the above

Lipohyalinosis appears as an eosinophilic deposit in the connective tissue of the vessel wall.

443

In lacunar infarction, what size of a small artery is occluded in brain ?

Harrison's 18th Ed. 3276

- A. 10 to 100 µm
- B. 20 to 200 µm
- C. 30 to 300 µm
- D. 40 to 400 µm

Lacunar infarction refers to infarction following atherothrombotic or lipohyalinotic occlusion of a small artery (30 to 300 µm) in brain.

444

“Lacune” in Latin means ?

Harrison's 18th Ed. 3276

- A. Deficient
- B. Lake
- C. River
- D. Stone

Lacunae in Latin mean “lake”. Clinically, lacunae are "small, deep cerebral infarcts".

445

The principal risk factor for lacunar infarcts is ?

Harrison's 18th Ed. 3276

- A. Hypertension
- B. Diabetes mellitus
- C. Cigarette smoking
- D. Stress

Hypertension and age are the principal risk factors for lacunar infarcts.

446

Lacunar infarcts range in size from ?

Harrison's 18th Ed. 3276

- A. 1 mm to 5 mm
- B. 1 mm to 10 mm
- C. 2 mm to 10 mm
- D. 3 mm to 20 mm

Lacunar infarcts range in size from 3 mm to 20 mm.

447 Which of the following is not a lacunar syndrome ?*Harrison's 18th Ed. 3276*

- A. Pure motor hemiparesis due to infarct in posterior limb of the internal capsule
- B. Pure sensory stroke due to infarct in ventrolateral thalamus
- C. Ataxic hemiparesis due to infarct in base of pons
- D. Dysarthria and clumsy hand due to infarction in medulla

Lacunar syndrome dysarthria and a clumsy hand or arm due to infarction in the ventral pons or in the genu of the internal capsule.

448 Which of the following increases risk of venous thrombosis and arterial thrombosis ?*Harrison's 18th Ed. 3278*

- A. Antiphospholipid syndrome
- B. Systemic malignancy
- C. Homocysteinemia
- D. Factor V Leiden mutation

Besides increasing risk of venous thrombosis, Protein S deficiency and homocysteinemia may cause arterial thromboses as well.

449 Which of the following can be a cause of embolic stroke ?*Harrison's 18th Ed. 3278*

- A. Polycythemia vera
- B. Libman-Sacks endocarditis
- C. Nephrotic syndrome
- D. Sickle cell anemia

Systemic lupus erythematosus with Libman-Sacks endocarditis can be a cause of embolic stroke.

450 Cerebral veins contain how much of the total cerebral blood volume ?*Semin Cerebrovasc Dis Stroke 2004;4:2-17*

- A. 30 %
- B. 50 %
- C. 70 %
- D. 90 %

Cerebral veins contain 70% of the total cerebral blood volume.

451 Veins that connect superior sagittal sinus with the scalp veins are called ?*Semin Cerebrovasc Dis Stroke 2004;4:2-17*

- A. Representative veins
- B. Envoy veins
- C. Emissary veins
- D. Messenger veins

Superior sagittal sinus (SSS) drains major part of the cortex. It also receives diploic veins, themselves connected to scalp veins by emissary veins, which explains the occurrence of SSS thrombosis after scalp infection or minor head trauma.

452 Lateral sinuses (LS) drain blood from which of the following ?*Semin Cerebrovasc Dis Stroke 2004;4:2-17*

- A. Cerebellum
- B. Brainstem
- C. Posterior part of cerebral hemispheres
- D. All of the above

The lateral sinuses (LS) drain blood from the cerebellum, brainstem, and posterior part of the cerebral hemispheres. They also receive some of the diploic veins and some small veins from the middle ear, another classic source of septic thrombosis.

453 Which of the following is a feature of superficial cerebral veins or cortical veins ?*Semin Cerebrovasc Dis Stroke 2004;4:2-17*

- A. Thin walls
- B. No muscle fibers
- C. No valves
- D. All of the above

The superficial cerebral veins or cortical veins have thin walls, no muscle fibers, and no valves, thereby permitting both dilation & reversal of the direction of blood flow when the sinus into which they drain is occluded.

454 Which of the following drain into cavernous sinuses ?*Semin Cerebrovasc Dis Stroke 2004;4:2-17*

- A. Superior and inferior ophthalmic veins
- B. Sphenoparietal sinus
- C. Middle cerebral vein
- D. All of the above

Cavernous sinuses drain the blood flow from the orbits through the superior & inferior ophthalmic veins, and from the anterior part of the base of brain by the sphenoparietal sinus and the middle cerebral vein.

455 The cavernous sinuses empty into which of the following ?*Semin Cerebrovasc Dis Stroke 2004;4:2-17*

- A. Superior petrosal sinus
- B. Straight sinus
- C. Great vein of Galen
- D. Superior sagittal sinus

The cavernous sinuses empty into both the superior and the inferior petrosal sinuses and ultimately into the internal jugular veins.

456 Thrombosis of which of the following venous sinuses mostly manifests as cranial nerve palsies ?*Semin Cerebrovasc Dis Stroke 2004;4:2-17*

- A. Petrosal sinuses
- B. Straight sinus
- C. Superior sagittal sinus
- D. Transverse sinus

Because of the close relationship of the petrosal sinuses to cranial nerves, thrombosis of petrosal sinuses (with or without thrombosis of transverse sinus) may produce cranial nerve palsies, especially cranial nerves III, V, VI, VII, and VIII. Thrombosis of the petrosal sinuses is characterized mainly by a fifth nerve palsy for the superior petrosal sinus and by a sixth nerve palsy for the inferior sinus.

457 Which of the following statements about thrombosis of cerebral venous sinuses is false ?*N Engl J Med 2005;352:1791-8*

- A. In most patients, thrombosis occurs in > one sinus
- B. Hypoplasia & atresia of transverse sinuses frequent
- C. A prothrombotic risk factor or a direct cause is identified in ~ 85 % of patients
- D. None of the above

458 The most common pattern of clinical presentations of CVT is ?*Semin Cerebrovasc Dis Stroke 2004;4:2-17*

- A. Focal deficits
- B. Isolated intracranial hypertension
- C. Subacute diffuse encephalopathy

D. Acute painful ophthalmoplegia

The most common pattern of clinical presentations of CVT (~75%) is characterized by the presence of focal signs such as focal deficits or partial seizures. Any neurological symptoms such as aphasia, hemiparesis, hemianopsia, and amnesia can occur with CVT. CVT can be totally asymptomatic.

- 459 The most frequent but least specific symptom of sinus thrombosis is ?
N Engl J Med 2005;352:1791-8
- A. Severe headache
 - B. Ophthalmoplegia
 - C. Focal deficits
 - D. Partial seizures

The most frequent but least specific symptom of sinus thrombosis is severe headache, which is present in >90 % of adult patients.

- 460 Classic picture of deep cerebral venous thrombosis is ?
Semin Cerebrovasc Dis Stroke 2004;4:2-17
- A. Intracranial hypertension
 - B. Progressive cerebellar incoordination & cranial N. palsies
 - C. Acute coma, decerebration & extrapyramidal hypertonia
 - D. Partial seizures

Classic picture of deep cerebral venous thrombosis is that of an acute coma with decerebration and extrapyramidal hypertonia leading to death within a few days, or complicated by akinetic mutism and dementia when resolving. Thrombosis of the deep venous system, the straight sinus and its branches, causes centrally located, often bilateral thalamic lesions, with behavioral symptoms such as delirium, amnesia, and mutism, which can be the only manifestation of sinus thrombosis. Thalamic edema is the imaging hallmark.

- 461 Venous sinus thrombosis pertains to which of the following ?
Harrison's 18th Ed. 3278
- A. Thrombosis of lateral sinus
 - B. Thrombosis of sagittal sinus
 - C. Thrombosis of small cortical veins
 - D. All of the above

Thrombosis of lateral or sagittal sinus or of small cortical veins fall under the category of venous sinus thrombosis.

- 462 Which of the following mutation carries a high risk of venous sinus thrombosis in women who take oral contraceptives ?
Harrison's 18th Ed. 3278
- A. Thrombin G20210 mutation
 - B. Prothrombin G20210 mutation
 - C. Antiprothrombin G20210 mutation
 - D. Antithrombin G20210 mutation

Women who take oral contraceptives and have the prothrombin G20210 mutation are at a high risk for sinus thrombosis. Also, it occurs as a complication of pregnancy and postpartum period, inflammatory bowel disease, intracranial infections (meningitis), and dehydration. It is also seen with increased incidence in patients with laboratory-confirmed thrombophilia including polycythemia, sickle cell anemia, deficiencies of proteins C and S, factor V Leiden mutation (resistance to activated protein C), antithrombin III deficiency, and homocysteinemia. Some patients with CVT carry more than one congenital thrombophilia factors. Extensive etiologic and complete coagulation work-up should be systematically performed in patients of CVT.

- 463 Which of the following investigation is normal in patients with venous sinus thrombosis ?
Harrison's 18th Ed. 3278
- A. CT
 - B. MR-venography
 - C. CT-venography

D. Conventional x-ray angiography

CT imaging is normal in patients with venous sinus thrombosis unless an intracranial venous hemorrhage has occurred, but the venous sinus occlusion is readily visualized using MR- or CT-venography or conventional x-ray angiography.

- 464 Which of the following is the brain CT finding in a case of superior sagittal sinus thrombosis ?
Semin Cerebrovasc Dis Stroke 2004;4:2-17
- A. Dense triangle sign
 - B. Empty delta sign
 - C. Cord sign
 - D. All of the above

Brain CT findings in CVT include the "dense triangle sign" (occlusion of SSS by fresh clot on noncontrast CT), the "empty delta sign" (filling of collateral veins in SSS wall after contrast injection, contrasting with the nonenhancement of clot inside the thrombosed sinus), and the "cord sign" (visualization of a thrombosed cortical vein on noncontrast CT). The same radiologic signs have been described on MRI. Normal brain CT scan does not rule out CVT.

- 465 Use of which of the following has no proven value in intracranial hypertension management in CVT ?
Semin Cerebrovasc Dis Stroke 2004;4:2-17
- A. Acetazolamide
 - B. Glycerol
 - C. Mannitol
 - D. Corticosteroids

Intracranial hypertension is common in CVT and should be treated immediately. Definitive treatment is establishing reperfusion of the venous structures (Heparin, Intravenous thrombolysis, thrombectomy). Elevating head of the bed by 30° improves venous drainage. Good pain control and thermal regulation, acetazolamide, glycerol, or mannitol, surgical ventricular drainage, and surgical decompression are useful. Corticosteroids should be avoided. They increase the risk of systemic infections and are of no proven value in CVT. Moreover, there is concern about their thrombogenic risk.

- 466 Recurrent sinus thrombosis within one year occurs in what percentage of patients ?
N Engl J Med 2005;352:1791-8
- A. 2 %
 - B. 4 %
 - C. 6 %
 - D. 8 %

Recurrent sinus thrombosis occurs in 2 % of patients and ~4 % of patients have an extracranial thrombotic event within one year.

- 467 Usually, vitamin K antagonists are given for what length of time after a first episode of sinus thrombosis ?
N Engl J Med 2005;352:1791-8
- A. Six months
 - B. One year
 - C. Five years
 - D. Life long

Optimal duration of oral anticoagulant treatment after the acute phase is unknown. Usually, vitamin K antagonists are given for six months after a first episode of sinus thrombosis, or longer in the presence of predisposing factors, with a target INR of 2.5.

- 468 Anticoagulation in patients with venous sinus thrombosis is often continued indefinitely if ?
Harrison's 18th Ed. 3278
- A. Hypercoagulable state is found
 - B. Thrombophilia is diagnosed
 - C. Patient has a h/o coma

- D. Patient has a h/o seizure

Intravenous heparin reduces morbidity & mortality, regardless of the presence of intracranial hemorrhage. If an underlying hypercoagulable state is not found, vitamin K antagonists (VKAs) are given for 3 - 6 months then switch over to aspirin. Anticoagulation is often continued indefinitely if thrombophilia is diagnosed.

469 Mortality after treatment with anticoagulant drugs in patients of cerebral venous sinus thrombosis (CVST) is ?

J Neurol Neurosurg Psychiatry 2001;70:105 - 108

- A. 2 % to 5 %
B. 5 % to 10 %
C. 10 % to 15 %
D. 15 % to 20 %

Treatment with anticoagulant drugs leads to a moderate benefit for patients with CVST compared with placebo treatment, but mortality after treatment with anticoagulant drugs is still 5% to 10%.

470 Sickle cell anemia (SS disease) is a common cause of stroke in ?

Harrison's 18th Ed. 3278

- A. Infants
B. Children
C. Adults
D. Old

Sickle cell anemia (SS disease) is a common cause of stroke in children.

471 Which of the following investigation is useful in predicting stroke in childhood in SS disease carriers ?

Harrison's 18th Ed. 3278

- A. MR-venography
B. CT-venography
C. Conventional x-ray angiography
D. Transcranial Doppler ultrasonography

Documenting high-velocity blood flow within MCAs using transcranial Doppler ultrasonography can predict the chances of stroke in childhood in SS disease carriers.

472 Which of the following is a common cause of stroke in children ?

Harrison's 18th Ed. 3278

- A. Temporal (giant cell) arteritis
B. Hypercoagulable disorders
C. Fibromuscular dysplasia
D. Sickle cell anemia

Sickle cell anemia (SS disease) is a common cause of stroke in children.

473 Which of the following about fibromuscular dysplasia is false ?

Harrison's 18th Ed. 3278

- A. Affects carotid or vertebral arteries
B. Occurs mainly in women
C. Involvement of renal arteries is common
D. None of the above

474 Which of the following is false about Temporal (giant cell) arteritis ?

Harrison's 18th Ed. 3278

- A. Affects elderly persons
B. Affects internal & external carotid system
C. May cause blindness
D. Rarely causes stroke

Temporal (giant cell) arteritis rarely causes stroke as internal carotid artery is usually not inflamed.

475 Which is the most common form of vasculitis that affects the carotid artery ?

Harrison's 16th Ed. 2379

- A. Temporal arteritis
B. Takayasu's arteritis
C. Kawasaki disease
D. Polyarteritis nodosa

476 Thalamoperforator branches arise from ?

- A. Internal carotid artery
B. Middle cerebral artery
C. Anterior cerebral artery
D. Posterior cerebral artery

477 Out of the following, lacunar infarcts are most frequent in ?

- A. Corpus callosum
B. White matter of internal capsule
C. Gray matter of cerebral surface
D. Cerebellum

Lacunar infarcts mainly occur in basal ganglia, putamen, thalamus and white matter of internal capsule, pons, & centrum semiovale. They occasionally occur in cerebellum, cerebral gyri & spinal cord & are rare in gray matter of cerebral surface, corpus callosum & visual radiations.

478 Which of the following is false about Charcot-Bouchard miliary aneurysm ?

- A. Aneurysms of brain blood vessels of <300 μ m diameter
B. Located in brainstem
C. Associated with chronic hypertension
D. None of the above

Charcot-Bouchard miliary aneurysms (French physicians Jean-Martin Charcot and Charles-Joseph Bouchard) are aneurysms of brain small blood vessels (<300 μ m diameter). While, saccular aneurysms (berry aneurysms) occur in larger-sized blood vessels. Charcot-Bouchard aneurysms are most often located in the brainstem and are associated with chronic hypertension.

479 Hypothesis of homunculus organization of fibers in internal capsule means ?

- A. Sensory & motor fibers have same orientation
B. Sensory & motor fibers have different orientation
C. Adjacent regions on cortex correspond on adjacent areas on body surface
D. None of the above

Homunculus means 'little man' in Latin. Functional mapping & lesion studies have shown that primary motor & somatosensory cortices are so arranged that adjacent regions on cortex correspond on adjacent areas on body surface. In somatotopic representations, arms are always medial to legs except in primary sensori-motor cortex & in posterior columns.

480 Which of the following tracts is not present in the posterior limb of internal capsule ?

- A. Cortico-pontine
B. Superior thalamic radiation
C. Anterior thalamic radiation
D. Corticospinal tract

Anterior thalamic radiation is part of anterior limb of internal capsule.

481 Genu of the internal capsule is at the level of ?

- A. Foramen of Lushka
B. Foramen of Magendie

- C. Foramen of Monro
- D. Foramen magnum

482 Hippocampus-fornix-anterior thalamus-cingulate gyrus-cingulum bundle-perihippocampal cortex-hippocampus - this circuit is called ?

- A. Papez's circuit
- B. Hafez's circuit
- C. Parkinson's circuit
- D. Peter's circuit

483 Moyamoya disease results from progressive stenosis and occlusion of ?

Harrison's 18th Ed. 3279

- A. Distal Basilar artery
- B. Distal vertebral artery
- C. Distal internal carotid artery
- D. None of the above

Moyamoya disease is an occlusive disease involving large intracranial arteries, especially distal internal carotid artery and stem of middle and anterior cerebral arteries.

484 'Moyamoya' in Japanese language means ?

Harrison's 18th Ed. 3279

- A. Cotton ball
- B. Pin head
- C. Puff of smoke
- D. Needle

Lenticulostriate arteries (anterior circulation) develop a rich collateral circulation around the occlusive lesion, which on conventional x-ray angiography appears like a "puff of smoke" (moyamoya in Japanese).

485 In Moyamoya disease, vascular inflammation is ?

Harrison's 18th Ed. 3279

- A. Absent
- B. Mild
- C. Moderate
- D. Severe

In Moyamoya disease, vascular inflammation is absent.

486 CADASIL is due to mutations in which gene ?

Harrison's 18th Ed. 3278

- A. Notch-1
- B. Notch-2
- C. Notch-3
- D. Notch-4

CADASIL is caused by mutations in Notch-3 gene. Notch-3 is a member of a highly conserved gene family characterized by epidermal growth factor repeats in its extracellular domain.

487 Which of the following is categorized under monogenic disorders as a cause of stroke ?

Harrison's 18th Ed. 3280

- A. CADASIL
- B. CARASIL
- C. HERNs
- D. All of the above

Stroke due to monogenic disorders represent <1% of all stroke patients. They are cerebral autosomal-dominant arteriopathy with subcortical infarcts and leukoencephalopathy (CADASIL), cerebral

autosomal-recessive arteriosclerosis with subcortical infarcts and leukoencephalopathy (CARASIL), hereditary endotheliopathy with retinopathy, nephropathy, and stroke (HERNS), Fabry disease, pseudoxanthoma elasticum, Neurofibromatosis type 1, familial MoyaMoya disease, Ehlers-Danlos syndrome type IV, Marfan syndrome.

488 Which of the following is false about CADASIL ?

Harrison's 18th Ed. 3279

- A. Onset is in IV or V decade of life
- B. Autosomal recessive condition
- C. Presents as small-vessel strokes, progressive dementia
- D. Extensive symmetric white matter changes in MRI

CADASIL (cerebral autosomal dominant arteriopathy with subcortical infarcts and leukoencephalopathy) is an autosomal dominant inherited disorder.

489 Which of the following is a monogenic ischemic stroke syndrome ?

Harrison's 18th Ed. 3280

- A. CARASIL
- B. HERNs
- C. CADASIL
- D. All of the above

490 Which of the following is a monogenic ischemic stroke syndrome ?

Harrison's 18th Ed. 3280

- A. Moyamoya disease
- B. Binswanger's disease
- C. CADASIL
- D. None of the above

CADASIL (cerebral autosomal dominant arteriopathy with subcortical infarcts and leukoencephalopathy) is a monogenic ischemic stroke syndrome. Genetic testing is available. Other monogenic ischemic stroke syndromes include cerebral autosomal recessive arteriopathy with subcortical infarcts and leukoencephalopathy (CARASIL) and hereditary endotheliopathy, retinopathy, nephropathy, and stroke (HERNS).

491 Which of the following disorders can mimic Multiple Sclerosis ?

Harrison's 18th Ed. 3402 Table 380-4

- A. Acute disseminated encephalomyelitis (ADEM)
- B. Mitochondrial encephalopathy with lactic acidosis and stroke (MELAS)
- C. Cerebral autosomal dominant arteriopathy, subcortical infarcts, and leukoencephalopathy (CADASIL)
- D. All of the above

492 Chronic progressive subcortical arteriosclerotic leukoencephalopathy is called ?

Harrison's 18th Ed. 3309

- A. Moyamoya disease
- B. Binswanger's disease
- C. CADASIL
- D. None of the above

Binswanger's disease is also called chronic progressive subcortical encephalopathy. It is one of the most common causes of dementia. The term Binswanger's disease should be used with caution, because it does not clearly identify a single entity.

493 Small-vessel strokes, progressive dementia, and extensive symmetric white matter changes in MRI is suggestive of which of the following ?

Harrison's 16th Ed. 2379

- A. Moyamoya disease
- B. Binswanger's disease

- C. CADASIL
D. None of the above

CADASIL (cerebral autosomal dominant arteriopathy with subcortical infarcts and leukoencephalopathy) is an inherited disorder that presents as small-vessel strokes, progressive dementia, and extensive symmetric white matter changes visualized by MRI in the fourth or fifth decade of life. It is caused by one of several mutations in Notch-3 gene.

494 Out of the following, which drug is of least importance in reducing the risk of stroke in hypertensives with TIA ?

Harrison's 18th Ed. 3281

- A. Thiazide diuretics
B. Calcium channel blockers
C. Angiotensin-converting enzyme inhibitors
D. Angiotensin receptor blockers

Lowering BP to normotensive levels reduces risk of stroke in hypertensives with TIA. Drugs of value are thiazide diuretics, ACE inhibitors & ARBs. Statins reduce it by 16-30%. In diabetics, pioglitazone is effective.

495 Which of the following is related to the trial 'SPARCL' ?

Harrison's 18th Ed. 3281

- A. Aspirin
B. Pioglitazone
C. Atorvastatin
D. Clopidogrel

496 Which of the following is false about Stroke Prevention by Aggressive Reduction in Cholesterol Levels (SPARCL) trial ?

Harrison's 18th Ed. 3281

- A. Done on patients with recent stroke or TIA
B. Secondary stroke reduction
C. Dose of atorvastatin used was 80 mg/day
D. None of the above

SPARCL (Stroke Prevention by Aggressive Reduction in Cholesterol Levels) trial showed benefit in secondary stroke reduction for patients with recent stroke or TIA who were prescribed atorvastatin, 80 mg/day.

497 Which of the following is a primary prevention trial advocating use of statins to reduce the risk of stroke ?

Harrison's 18th Ed. 3281

- A. SPARCL
B. CAPRIE
C. JUPITER
D. MATCH

Justification for the Use of Statins in Prevention: An Intervention Trial Evaluating Rosuvastatin (JUPITER) was a primary prevention trial. It found that patients with low LDL (<130 mg/dL) caused by elevated C-reactive protein benefitted by daily use of rosuvastatin. Primary stroke occurrence was reduced by 51% with no increase in rates of intracranial hemorrhage.

498 Which of the following platelet antiaggregation agents is least preferred to prevent atherothrombotic events ?

Harrison's 18th Ed. 3281

- A. Aspirin
B. Clopidogrel
C. Dipyridamole
D. Ticlopidine

Though Ticlopidine is more effective than aspirin, it has been abandoned because of its adverse effects like diarrhea, skin rash, neutropenia and thrombotic thrombocytopenic purpura (TTP).

499 Which of the following drug was studied in the CAPRIE, MATCH and CHARISMA trials ?

Harrison's 18th Ed. 3281

- A. Ticlopidine
B. Dipyridamole
C. Clopidogrel & Aspirin
D. Statins

These three trials concluded that use of clopidogrel in combination with aspirin is not recommended for stroke prevention. But, may be beneficial in acute period.

500 Which of the following drug was studied in the ESPS II, ESPRIT and PROFESS trials ?

Harrison's 18th Ed. 3281

- A. Ticlopidine & Aspirin
B. Dipyridamole & Aspirin
C. Clopidogrel & Aspirin
D. Statins & Aspirin

Dipyridamole with aspirin combination drug was studied in three trials.

501 Which of the following is the principal side effect of dipyridamole ?

Harrison's 18th Ed. 3281

- A. Diarrhea
B. Headache
C. Skin rash
D. Neutropenia

The principal side effect of dipyridamole is headache.

502 What is the overall 'relative' reduction in risk of all vascular events with antiplatelet agents ?

Harrison's 18th Ed. 3282

- A. 5 %
B. 10 %
C. 18 %
D. 25 %

Antiplatelet agents produce an overall relative reduction in risk of nonfatal stroke of about 25-30% and of all vascular events of about 25%.

503 In chronic nonvalvular, nonrheumatic AF, anticoagulation with warfarin reduces risk of cerebral embolism by ?

Harrison's 18th Ed. 3282

- A. ~ 17 %
B. ~ 27 %
C. ~ 47 %
D. ~ 67 %

In chronic nonvalvular, nonrheumatic atrial fibrillation, warfarin (a vitamin K antagonist - VKA) reduces the risk of cerebral embolism by ~67% both for primary & secondary prevention of stroke or TIA. The risk of a major bleeding complication is 1-3% per year.

504 In ACTIVE-A trial, which of the following drugs was not used ?

Harrison's 18th Ed. 3282

- A. Clopidogrel
B. Aspirin
C. Ticlopidine

D. Irbesartan

In Atrial Fibrillation Clopidogrel Trial with Irbesartan for Prevention of Vascular Events (ACTIVE-A) trial, patients who cannot take anticoagulants, clopidogrel plus aspirin was compared to aspirin alone.

505 Which of the following trials does not address carotid endarterectomy ?

Harrison's 18th Ed. 3282

- A. ACAS
- B. ECST
- C. WARSS
- D. NASCET

Warfarin-Aspirin Reinfarction Stroke Study (WARSS) study found no benefit of warfarin sodium over aspirin for secondary prevention of stroke. Similarly, Warfarin-Aspirin Symptomatic Intracranial Disease (WASID) study demonstrated no benefit of warfarin over aspirin in patients with symptomatic intracranial atherosclerosis. North American Symptomatic Carotid Endarterectomy Trial (NASCET) and the European Carotid Surgery Trial (ECST) showed a substantial benefit for surgery in patients with a symptomatic carotid stenosis of $\geq 70\%$. ECST found harm for patients with stenosis $< 30\%$ treated surgically. Meta-analysis of NASCET and ECST trials showed that endarterectomy is most beneficial when performed within 2 weeks of symptom onset, in patients > 75 years, and men appear to benefit more than women.

506 What is the annual stroke rate in the natural history of asymptomatic carotid stenosis ?

Harrison's 18th Ed. 3283

- A. ~ 1 %
- B. ~ 2 %
- C. ~ 3 %
- D. ~ 4 %

507 What is the annual stroke rate in the natural history of symptomatic carotid stenosis ?

Harrison's 18th Ed. 3283

- A. ~ 10 %
- B. ~ 11 %
- C. ~ 12 %
- D. ~ 13 %

The natural history of asymptomatic carotid stenosis is ~2% per year stroke rate, while symptomatic patients experience a 13% per year risk of stroke.

508 SAPHIRE, CREST, and ICSS pertain to which of the following ?

Harrison's 18th Ed. 3283

- A. Anticoagulation in stroke
- B. Use of atherothrombotics in TIA/stroke
- C. Carotid artery stenting and angioplasty
- D. Extracranial-to-intracranial (EC-IC) bypass surgery

Stenting and Angioplasty with Protection in Patients at High Risk for Endarterectomy (SAPHIRE) trial was done in high risk patients with symptomatic carotid stenosis $> 50\%$ or asymptomatic stenosis $> 80\%$ by either stenting combined with a distal emboli-protection device or endarterectomy. Carotid Revascularization Endarterectomy versus Stenting Trial (CREST) and International Carotid Stenting (ICSS) trial also studied symptomatic patients treated with stents or endarterectomy.

509 Which of the following is a category of stroke syndromes ?

Harrison's 18th Ed. 3284

- A. Large vessel stroke within anterior circulation
- B. Large-vessel stroke within posterior circulation
- C. Small-vessel disease of either vascular bed
- D. All of the above

Stroke syndromes are divided into large vessel stroke within anterior circulation, large-vessel stroke within posterior circulation and small-vessel disease of either vascular bed.

510 Occlusion of proximal MCA is most often due to ?

Harrison's 18th Ed. 3284

- A. Embolus
- B. Intracranial atherothrombosis
- C. Vasospasm
- D. None of the above

Occlusion of proximal MCA or one of its major branches is mostly due to embolus (artery-to-artery, cardiac) rather than intracranial atherothrombosis.

511 Cortical branches of MCA supply which of the following ?

Harrison's 18th Ed. 3284

- A. Frontal pole
- B. Lower temporal pole convolution
- C. Occipital pole convolution
- D. None of the above

Cortical branches of MCA supply the lateral surface of hemisphere except for frontal pole and a strip along the superomedial border of frontal and parietal lobes (supplied by ACA), and lower temporal and occipital pole convolutions (supplied by PCA).

512 Lenticulostriate arteries from proximal MCA (M1 segment) supply all except ?

Harrison's 18th Ed. 3284

- A. Putamen
- B. Outer globus pallidus
- C. Anterior limb of internal capsule
- D. Body of caudate nucleus

Proximal MCA (M1 segment) gives rise to penetrating lenticulostriate arteries that supply putamen, outer globus pallidus, posterior limb of internal capsule, adjacent corona radiata & most of caudate nucleus.

513 Temporal cortex is supplied by ?

Harrison's 18th Ed. 3284

- A. Inferior division of MCA
- B. Superior division of MCA
- C. ACA
- D. PCA

MCA divides into superior & inferior divisions (M2 branches) in sylvian fissure. Branches of the inferior division supply inferior parietal and temporal cortex, and superior division supply the frontal and superior parietal cortex.

514 In a right handed person, occlusion of right MCA leads to all except ?

Harrison's 18th Ed. 3284

- A. Global aphasia
- B. Anosognosia
- C. Constructional apraxia
- D. Dysarthria

Global aphasia occurs when the dominant hemisphere is involved. When nondominant hemisphere is affected, anosognosia, constructional apraxia, and neglect are found. Contralateral hemiplegia, hemianesthesia, homonymous hemianopia occur in both instances. Dysarthria is common because of facial weakness.

515 Which of the following artery supplying dominant hemisphere is occluded in Wernicke's aphasia without weakness ?

Harrison's 18th Ed. 3284

- A. Stem of MCA
- B. Penetrating lenticulostriate arteries of MCA
- C. Proximal superior division of MCA

D. Inferior division of MCA

If a fluent (Wernicke's) aphasia occurs without weakness, inferior division of MCA supplying posterior part (temporal cortex) of dominant hemisphere is probably involved.

516 Which of the following artery supplying the nondominant hemisphere is occluded in a case of hemineglect or spatial agnosia without weakness ?

Harrison's 18th Ed. 3284

- A. Stem of MCA
- B. Penetrating lenticulostriate arteries of MCA
- C. Proximal superior division of MCA
- D. Inferior division of MCA

Hemineglect or spatial agnosia without weakness indicates that the inferior division of MCA in the nondominant hemisphere is occluded.

517 Which of the following artery is occluded in a case of pure motor stroke contralateral to the lesion ?

Harrison's 18th Ed. 3284

- A. Stem of MCA
- B. Penetrating lenticulostriate arteries of MCA
- C. Proximal superior division of MCA
- D. Inferior division of MCA

Occlusion of a lenticulostriate vessel of MCA produces lacunar stroke within the internal capsule producing pure motor stroke or sensory-motor stroke contralateral to the lesion.

518 Lacunar infarction affecting which of the following areas produces very few clinical signs ?

Harrison's 18th Ed. 3284

- A. Genu of internal capsule
- B. Posterior limb of internal capsule
- C. Globus pallidus and putamen
- D. All of the above

Lacunar infarction affecting the globus pallidus and putamen often produce few clinical signs, but parkinsonism and hemiballismus occur.

519 Anterior cerebral artery (ACA) arises from the Internal carotid artery at the level of ?

- A. Anterior clinoid process
- B. Optic chiasma
- C. Optic nerve
- D. Olfactory trigone

520 "Recurrent artery of Heubner" supplies which part of internal capsule ?

- A. Anterior limb
- B. Genu
- C. Posterior limb
- D. Retrolentiform part

521 "Recurrent artery of Heubner" is a branch of ?

- A. Internal carotid artery
- B. Anterior cerebral artery
- C. Middle cerebral artery
- D. Posterior cerebral artery

Johann Otto Leonhardt Heubner (1843-1926) described this artery in 1872. He also described syphilitic endarteritis (Heubner's disease). Lenticulostriate Recurrent artery of Heubner (RAH) supplies parts of basal ganglia and anterior limb of internal capsule and can be damaged with improper clip placement during repair of aneurysms near the anterior communicating artery.

522 "Arteria termatica of Wilder" is a branch of ?

- A. Internal carotid artery
- B. Anterior cerebral artery
- C. Middle cerebral artery
- D. Posterior cerebral artery

Wilder was the first to describe fusion of both A2 segments to form a single artery & introduced the term arteria termatica of Wilder in 1885. Also known as the unpaired pericallosal stem artery, unpaired anterior cerebral artery, common anterior cerebral trunk & azygos pericallosal artery.

523 Which of the following is not supplied by the deep penetrating branches of the A1 segment of ACA ?

Harrison's 18th Ed. 3285

- A. Anterior limb of internal capsule
- B. Amygdala
- C. Body of caudate nucleus
- D. Anterior hypothalamus

The A1 segment of anterior cerebral artery (ACA) gives rise to deep penetrating branches that supply the anterior limb of internal capsule, anterior perforate substance, amygdala, anterior hypothalamus, and inferior part of the head of caudate nucleus.

524 Occlusion of a single A2 segment of anterior cerebral artery (ACA) results in which of the following ?

Harrison's 18th Ed. 3285

- A. Abulia
- B. Bilateral pyramidal signs with paraparesis
- C. Urinary incontinence
- D. All of the above

Occlusion of a single A2 segment of ACA results in profound abulia, bilateral pyramidal signs with paraparesis and urinary incontinence.

525 Anterior choroidal artery arises from ?

Harrison's 18th Ed. 3285

- A. Internal carotid artery
- B. Middle cerebral artery
- C. Anterior cerebral artery
- D. Posterior cerebral artery

Anterior choroidal artery arises from ICA & supplies posterior limb of internal capsule & white matter posterolateral to it, through which geniculocalcarine fibers pass partly.

526 Complete syndrome of anterior choroidal artery occlusion consists of ?

Harrison's 18th Ed. 3285

- A. Contralateral hemiplegia
- B. Hemianesthesia
- C. Homonymous hemianopia
- D. All of the above

The complete syndrome of anterior choroidal artery occlusion consists of contralateral hemiplegia, hemianesthesia and homonymous hemianopia.

527 Anterior choroidal strokes are usually the result of ?

Harrison's 18th Ed. 3285

- A. Embolus
- B. Thrombosis
- C. Vasospasm
- D. None of the above

Anterior choroidal strokes are usually the result of in situ thrombosis, and iatrogenic occlusion during surgical clipping of aneurysms of ICA.

528 "Fetal posterior cerebral artery" refers to ?*Harrison's 18th Ed. 3286*

- A. Single PCA
- B. Absent PCA
- C. PCA arising from internal carotid artery (ICA)
- D. PCA arising from MCA

*Anatomic configuration of PCA arising from ICA is called fetal posterior cerebral artery (20%).***529 Bilateral common carotid artery occlusions at their origin may occur in ?***Harrison's 18th Ed. 3286*

- A. Temporal arteritis
- B. Takayasu's arteritis
- C. Kawasaki disease
- D. Polyarteritis nodosa

*Bilateral common carotid artery occlusions at their origin may occur in Takayasu's arteritis.***530 The vertebral arteries join to form the basilar artery at ?***Harrison's 18th Ed. 3286*

- A. Foramen magnum
- B. Lower medulla oblongata
- C. Pontomedullary junction
- D. Interpeduncular fossa

*Vertebral arteries join to form basilar artery at the pontomedullary junction.***531 Basilar artery divides into 2 posterior cerebral arteries at ?***Harrison's 18th Ed. 3286*

- A. Foramen magnum
- B. Lower medulla oblongata
- C. Pontomedullary junction
- D. Interpeduncular fossa

*Basilar artery divides into two posterior cerebral arteries in the interpeduncular fossa.***532 Posterior circulation supplies which of the following ?***Harrison's 18th Ed. 3286*

- A. Hippocampus
- B. Medial temporal lobes
- C. Occipital lobes
- D. All of the above

*The posterior circulation is composed of the paired vertebral arteries, the basilar artery, and the paired posterior cerebral arteries. It supplies the cerebellum, medulla, pons, midbrain, subthalamus, thalamus, hippocampus, and medial temporal and occipital lobes.***533 The artery of Percheron arises from ?***Harrison's 18th Ed. 3287*

- A. Anterior cerebral artery
- B. Posterior cerebral artery
- C. Vertebral artery
- D. Basilar artery

*Thalamogeniculate, Percheron and posterior choroidal arteries are the penetrating branches of the proximal P1 segment of PCA.***534 Occlusion of artery of Percheron produces ?***Harrison's 18th Ed. 3287*

- A. Paresis of upward gaze

- B. Drowsiness
- C. Abulia
- D. All of the above

*Occlusion of artery of Percheron produces paresis of upward gaze, drowsiness & abulia.***535 Weber's syndrome results due to occlusion of ?***Harrison's 18th Ed. 3287*

- A. Anterior cerebral artery
- B. Middle cerebral artery
- C. Posterior cerebral artery
- D. Basilar artery

536 Claude's syndrome results due to occlusion of ?*Harrison's 18th Ed. 3287*

- A. Anterior cerebral artery
- B. Middle cerebral artery
- C. Posterior cerebral artery
- D. Basilar artery

537 In Claude's syndrome, ataxia is due to involvement of ?*Harrison's 18th Ed. 3287*

- A. Cerebellum
- B. Superior cerebellar peduncle
- C. Red nucleus
- D. All of the above

*III nerve palsy with contralateral ataxia is called Claude's syndrome. Ataxia is due to involvement of red nucleus or dentatorubrothalamic tract.***538 In Weber's syndrome, hemiplegia is due to involvement of ?***Harrison's 18th Ed. 3287*

- A. Internal capsule
- B. Cerebral peduncle
- C. Corpus callosum
- D. Pyramidal decussation

*III nerve palsy with contralateral hemiplegia is called Weber's syndrome. Hemiplegia is localized to the cerebral peduncle. Hermann Weber, German physician, 1863.***539 Complete oculomotor nerve lesion results in all except ?**

- A. Ipsilateral ptosis
- B. Pupillary dilatation
- C. Loss of pupillary & accommodation reflexes
- D. Medial deviation of the eye

*Complete oculomotor (III) nerve lesion results in ipsilateral ptosis, pupillary dilatation, loss of pupillary and accommodation reflexes and 'lateral' deviation of the eye. III CN supplies all extra-ocular muscles except lateral rectus and superior oblique.***540 Edinger-Westphal nucleus located in ?**

- A. Upper mid-brain
- B. Lower mid-brain
- C. Pons
- D. Medulla oblongata

541 Fascicles from III CN nuclei run forward & laterally through ?

- A. Substantia nigra
- B. Red nuclei

- C. Dentate nuclei
- D. Olivary nuclei

III cranial nerve nuclei are located in midbrain. They consist of Edinger-Westphal nucleus located in upper mid-brain supplying fibers to pupils and motor nucleus located in lower mid-brain supplying extra-ocular muscles, except lateral rectus and superior oblique. Fascicles from the III CN nuclei run forward & laterally through red nuclei and converge at the inter-peduncular fossa. Lesion of lower mid-brain affects extraocular muscles but spares pupils, whereas lesions involving both upper & lower parts of mid-brain are associated with pupillary dilatation.

- 542 Lower branch of oculomotor nerve supplies all of the following extraocular muscles except ?**
- A. Medial rectus
 - B. Levator palpebrae superioris
 - C. Inferior rectus
 - D. Inferior oblique

After emerging from mid-brain, III CN lies between posterior cerebral artery and the superior cerebellar artery. It runs forward parallel to the posterior communicating artery and enters the orbit through the superior orbital fissure, dividing into an upper and a lower branch. The upper branch supplies the levator palpebrae superioris and superior rectus muscles. The lower branch supplies three muscles: the medial rectus, the inferior rectus, and the inferior oblique muscle. The nerve to the inferior oblique muscle conveys the preganglionic parasympathetic fibers to the ciliary ganglion from which the post-ganglionic parasympathetic fibers arise to supply the ciliary muscle and the muscles of the iris (pupilloconstrictor fibers).

- 543 Hemiballismus is due to damage to which of the following ?**
Harrison's 18th Ed. 3287
- A. Substantia nigra
 - B. Red nucleus
 - C. Thalamus
 - D. Subthalamic nucleus

If the subthalamic nucleus is involved, contralateral hemiballismus may occur.

- 544 Which of the following is false about "Thalamic Dejerine-Roussy syndrome" ?**
Harrison's 18th Ed. 3287
- A. Contralateral hemisensory loss
 - B. Agonizing pain in affected area later
 - C. Responds poorly to analgesics
 - D. None of the above

Thalamic Dejerine-Roussy syndrome consists of contralateral hemisensory loss followed later by agonizing, searing or burning pain in the affected areas. Symptoms are persistent and respond poorly to analgesics. May respond to carbamazepine or gabapentin.

- 545 Occlusion of the posterior cerebral artery can produce which of the following ?**
Harrison's 18th Ed. 3287
- A. Peduncular hallucinosis
 - B. Contralateral homonymous hemianopia, macular sparing
 - C. Acute disturbance in memory
 - D. All of the above

All the above presentations occur due to occlusion of distal PCA causing infarction of hippocampus, medial temporal & occipital lobes. Peduncular hallucinosis means visual hallucinations of brightly colored scenes & objects. Because memory has bilateral representation, this defect clears soon.

- 546 Anton's syndrome results due to occlusion of ?**
Harrison's 18th Ed. 3287
- A. Bilateral occlusion of distal ACA
 - B. Bilateral occlusion of distal MCA
 - C. Bilateral occlusion of distal PCA

- D. Bilateral occlusion of vertebral artery

Anton's syndrome is due to bilateral infarction in the distal PCAs. It produces cortical blindness with preserved pupillary light reaction.

- 547 In Anton's syndrome, patient is often unaware of ?**
Harrison's 18th Ed. 3287
- A. Smell
 - B. Hearing
 - C. Blindness
 - D. Colour vision

In Anton's syndrome, patient is unaware of blindness. Bilateral infarction in distal PCAs produces cortical blindness (blindness with preserved pupillary light reaction).

- 548 Which symptom can occur in Balint's syndrome ?**
Harrison's 18th Ed. 3287
- A. Optic ataxia
 - B. Oculomotor apaxia
 - C. Asimultanagnosia
 - D. All of the above

Balint's syndrome is a disorder of the orderly visual scanning of the environment, usually resulting from infarctions secondary to low flow in "watershed" between distal PCA & MCA territories. There occurs persistence of a visual image for several minutes despite gazing at another scene (palinopsia) or an inability to synthesize whole of an image (asimultanagnosia).

- 549 Experiencing persistence of a visual image for several minutes despite gazing at another scene is called ?**
Harrison's 18th Ed. 3287
- A. Optic ataxia
 - B. Ocular ataxia
 - C. Simultagnosia
 - D. Palinopia

In palinopia, patients experience persistence of a visual image for several minutes despite gazing at another scene.

- 550 The vertebral artery enters into the transverse cervical vertebral foramen at ?**
Harrison's 18th Ed. 3288
- A. C7
 - B. C6
 - C. C4
 - D. C3

The first (V1) segment of vertebral artery extends from its origin to its entrance into the sixth or fifth transverse vertebral foramen.

- 551 Branches from which segment of vertebral artery supply brainstem and cerebellum ?**
Harrison's 18th Ed. 3288
- A. 1
 - B. 2
 - C. 3
 - D. 4

Fourth (V4) segment of vertebral artery courses upward from foramen magnum to join the other vertebral artery and forms the basilar artery. Only the fourth segment gives rise to branches that supply the brainstem and cerebellum.

- 552 Which segment of the vertebral artery pierce the dura at the foramen magnum ?**
Harrison's 18th Ed. 3288

- A. 1
- B. 2
- C. 3
- D. 4

Third segment of vertebral artery (V3) passes through transverse foramen and circles around the arch of the atlas to pierce dura at foramen magnum.

553 Which of the following statements about vertebral artery is false ?

Harrison's 18th Ed. 3288

- A. Arises from innominate artery on right side
- B. Consists of four segments
- C. Atherothrombotic lesion has predilection for V3 segment
- D. None of the above

Atherothrombotic lesions have a predilection for V1 & V4 segments of vertebral artery. Atheromatous disease rarely narrows second and third segments of vertebral artery, but this region is subject to dissection, fibromuscular dysplasia, and, rarely, encroachment by osteophytic spurs within the vertebral foramina.

554 "Subclavian steal" is best related to ?

Harrison's 18th Ed. 3288

- A. Raynauds phenomenon
- B. Posterior circulation TIA
- C. Upper limb clubbing
- D. All of the above

If the subclavian artery is occluded proximal to the origin of vertebral artery, there is reversal in the direction of blood flow in the ipsilateral vertebral artery. Exercise of the ipsilateral arm may increase demand on vertebral flow, producing posterior circulation TIAs, or "subclavian steal."

555 In medial medullary syndrome, which of the following structures is involved ?

Harrison's 18th Ed. 3289 Figure 370-10

- A. Ipsilateral twelfth nerve
- B. Contralateral pyramidal tract
- C. Contralateral medial lemniscus
- D. All of the above

Medial medullary syndrome is due to occlusion of vertebral artery or branch of vertebral or lower basilar artery. Paralysis with atrophy of half tongue due to ipsilateral XII nerve occurs. On the opposite side, due to involvement of pyramidal tract & medial lemniscus, paralysis of arm & leg, impaired tactile & proprioceptive sense over half the body occur. Face is spared.

556 Occlusion of which of the following artery is responsible for producing lateral medullary syndrome ?

Harrison's 18th Ed. 3289 Figure 370-10

- A. Vertebral
- B. Posterior inferior cerebellar
- C. Superior lateral medullary artery
- D. All of the above

Occlusion of any of the five vessels is responsible for producing lateral medullary syndrome. They are vertebral, posterior inferior cerebellar, superior, middle or inferior lateral medullary arteries.

557 Which of the following is false for lateral medullary syndrome ?

Harrison's 18th Ed. 3289 Figure 370-10

- A. Falling to side of lesion
- B. Horner's syndrome
- C. Impaired touch over opposite half of face
- D. Loss of taste

Due to damage to descending tract and nucleus of fifth nerve, pain, numbness, impaired sensation over half the face occurs on the side of lesion.

558 Which of the following is false for lateral medullary syndrome ?

Harrison's 18th Ed. 3289 Figure 370-10

- A. Oscillopsia
- B. Nystagmus
- C. Strabismus
- D. Dysphagia

Due to damage to vestibular nucleus, nystagmus, diplopia, oscillopsia, vertigo, nausea & vomiting occur in lateral medullary syndrome. Dysphagia, hoarseness, paralysis of palate & vocal cord, diminished gag reflex occur due to damage to issuing fibers of IX & X nerves.

559 Loss of taste in lateral medullary syndrome is due to lesion in ?

Harrison's 18th Ed. 3289 Figure 370-10

- A. Nucleus of fifth nerve
- B. Vestibular nucleus
- C. Nucleus and tractus solitarius
- D. Cuneate and gracile nuclei

Loss of taste in lateral medullary syndrome is due to lesion in nucleus & tractus solitarius on side of lesion.

560 Nystagmus, diplopia, oscillopsia, vertigo, nausea, vomiting in lateral medullary syndrome is due to lesion in ?

Harrison's 18th Ed. 3289 Figure 370-10

- A. Descending sympathetic tract
- B. Cerebellar hemisphere
- C. Vestibular nucleus
- D. Spinocerebellar tract

Nystagmus, diplopia, oscillopsia, vertigo, nausea, vomiting in lateral medullary syndrome is due to lesion in Vestibular nucleus.

561 Numbness of ipsilateral arm, trunk, or leg in lateral medullary syndrome is due to lesion in ?

Harrison's 18th Ed. 3289 Figure 370-10

- A. Nucleus of fifth nerve
- B. Vestibular nucleus
- C. Nucleus and tractus solitarius
- D. Cuneate and gracile nuclei

Numbness of ipsilateral arm, trunk, or leg in lateral medullary syndrome is due to lesion in cuneate and gracile nuclei.

562 Which of the following is not a part of lateral medullary (or Wallenberg's) syndrome ?

Harrison's 18th Ed. 3289 Figure 370-10

- A. Vertigo
- B. Numbness of ipsilateral face
- C. Numbness of contralateral limbs
- D. Contralateral Horner's syndrome

Horner's syndrome (miosis, ptosis, decreased sweating) occurs on side of lesion in lateral medullary syndrome due to damage to descending sympathetic tract.

563 Which of the following is not a feature of vertebral artery occlusion ?

Harrison's 18th Ed. 3288

- A. Vertigo
- B. Diplopia
- C. Hoarseness
- D. Hemiparesis

Embolic occlusion or thrombosis of a V4 segment causes ischemia of the lateral medulla. The constellation of vertigo, numbness of the ipsilateral face and contralateral limbs, diplopia, hoarseness, dysarthria, dysphagia, and ipsilateral Horner's syndrome is called the lateral medullary (or Wallenberg's) syndrome. Hemiparesis is not a feature of vertebral artery occlusion.

- 564 **Constellation of bilateral long tract signs with signs of cranial nerve and cerebellar dysfunction is suggestive of ?**
Harrison's 18th Ed. 3289 Figure 370-10
- A. Complete basilar artery occlusion
 - B. Complete posterior cerebral artery occlusion
 - C. Complete middle cerebral artery occlusion
 - D. Complete anterior cerebral artery occlusion

Constellation of bilateral long tract signs (sensory and motor) with signs of cranial nerve and cerebellar dysfunction is suggestive of complete basilar artery occlusion.

- 565 **Which of the following syndromes occur due to occlusion of vertebral artery ?**
Harrison's 18th Ed. 3289 Figure 370-10
- A. Medial medullary syndrome
 - B. Lateral medullary syndrome
 - C. Total unilateral medullary syndrome
 - D. All of the above

Occlusion of vertebral artery can produce medial and lateral and total unilateral medullary syndrome. The last one being a combination of medial and lateral syndromes.

- 566 **Lateral pontomedullary syndrome is due to occlusion of which of the following vessel ?**
Harrison's 18th Ed. 3289 Figure 370-10
- A. Vertebral artery
 - B. Basilar artery
 - C. Anterior inferior cerebellar artery
 - D. Superior cerebellar artery

Lateral pontomedullary syndrome is due to occlusion of vertebral artery.

- 567 **Which of the following syndromes occur due to occlusion of anterior inferior cerebellar artery ?**
Harrison's 18th Ed. 3290 Figure 370-11
- A. Medial medullary syndrome
 - B. Medial inferior pontine syndrome
 - C. Lateral inferior pontine syndrome
 - D. All of the above

Occlusion of anterior inferior cerebellar artery produces lateral inferior pontine syndrome.

- 568 **Which of the following syndrome occurs due to occlusion of superior cerebellar artery ?**
Harrison's 18th Ed. 3292 Figure 370-13
- A. Lateral midpontine syndrome
 - B. Medial superior pontine syndrome
 - C. Lateral superior pontine syndrome
 - D. Total unilateral medullary syndrome

Lateral superior pontine syndrome occurs due to occlusion of superior cerebellar artery - a branch of basilar artery.

- 569 **Corticobulbar and corticospinal tracts are damaged bilaterally due to occlusion of ?**
Harrison's 18th Ed. 3288
- A. Vertebral artery

- B. Basilar artery
- C. Anterior inferior cerebellar artery
- D. Superior cerebellar artery

Basilar artery or lone vertebral artery occlusion can damage corticobulbar and corticospinal tracts bilaterally. Complete basilar occlusion leads to a constellation of bilateral long tract signs (sensory and motor) with signs of cranial nerve and cerebellar dysfunction.

- 570 **Horner's syndrome is produced by occlusion of which of the following arteries ?**
Harrison's 16th Ed. 2383, 2384, 2386
- A. Anterior inferior cerebellar artery
 - B. Superior cerebellar artery
 - C. Vertebral artery
 - D. All of the above

In lateral medullary syndrome due to occlusion of vertebral artery, Horner's syndrome occurs due to damage to descending sympathetic tract. Lateral inferior pontine syndrome due to occlusion of anterior inferior cerebellar artery produces Horner's syndrome. Lateral superior pontine syndrome due to occlusion of superior cerebellar artery sometimes produces Horner's syndrome.

- 571 **Deafness is produced by occlusion of which of the following arteries ?**
Harrison's 18th Ed. 3289
- A. Anterior inferior cerebellar artery
 - B. Upper basilar artery
 - C. Anterior cerebral artery
 - D. Any of the above

- 572 **Which of the following is not reliably detected by CT radiographic images ?**
Harrison's 18th Ed. 3290
- A. Cerebral infarction for first 24 to 48 hours
 - B. Ischemic strokes in posterior fossa
 - C. Small cortical infarcts
 - D. All of the above

Cerebral infarction infarct may not be seen reliably for 24 to 48 hours. Also, CT may fail to show small ischemic strokes in posterior fossa and small infarcts on cortical surface.

- 573 **"Insular ribbon sign" is an earliest indicator of ?**
Harrison's 16th Ed. 2386
- A. Meningitis
 - B. Subarachnoid hemorrhage
 - C. Cerebral infarction
 - D. All of the above

"Insular ribbon sign" is caused by edema within insular cortex and basal ganglia and is an earliest indicator of cerebral infarction in MCA territory.

- 574 **Which of the following is used to visualize extra- or intracranial arterial dissection ?**
Harrison's 18th Ed. 3291
- A. MR angiography
 - B. MRI with fat saturation
 - C. MRI with IV gadolinium contrast
 - D. All of the above

MRI with fat saturation is used to visualize extra- or intracranial arterial dissection as it images clotted blood within dissected vessel wall.

Intracranial hemorrhage

575 In intraparenchymal hemorrhage, mean arterial blood pressure should be ?

Harrison's 18th Ed. 3293

- A. < 160 mm Hg
- B. < 150 mm Hg
- C. < 140 mm Hg
- D. < 130 mm Hg

576 Which of the following drugs is useful in lowering blood pressure in intraparenchymal hemorrhage ?

Harrison's 18th Ed. 3293

- A. Nicardipine
- B. Labetalol
- C. Esmolol
- D. All of the above

Intraparenchymal hemorrhage is exacerbated by acutely elevated BP & should be lowered to a mean arterial BP of <130 mm Hg by nonvasodilating IV drugs (nicardipine, labetalol or esmolol).

577 Out of the following hemorrhagic stroke subtypes, which has the maximum frequency of occurrence ?

Harrison's 18th Ed. 3294

- A. Intraparenchymal
- B. Subdural
- C. Epidural
- D. Subarachnoid

Intraparenchymal hemorrhage is the most common type of intracranial hemorrhage. It accounts for ~10% of all strokes and is associated with a 50% case fatality rate. Hypertension, trauma and cerebral amyloid angiopathy cause the majority of intraparenchymal hemorrhage.

578 Which of the following is the most important causes of intraparenchymal hemorrhage in the young ?

Harrison's 18th Ed. 3294

- A. Hypertension
- B. Cerebral amyloid angiopathy
- C. Cocaine use
- D. Heavy alcohol consumption

Advanced age and heavy alcohol consumption increase the risk of intraparenchymal hemorrhage. Cocaine use is one of the most important causes in young (<45 years). Intracerebral hemorrhage, ischemic stroke, and SAH are all associated with cocaine use.

579 Hypertensive intraparenchymal hemorrhage is due to spontaneous rupture of ?

Harrison's 18th Ed. 3294

- A. Penetrating artery
- B. Bifurcation of artery
- C. Aneurysm of artery
- D. Any of the above

Hypertensive intraparenchymal hemorrhage usually results from spontaneous rupture of a small penetrating artery deep in the brain.

580 Which of the following is not a common site for hypertensive intraparenchymal hemorrhage ?

Harrison's 18th Ed. 3294

- A. Basal ganglia

- B. Cerebellum
- C. Pons
- D. Medulla oblongata

The most common sites of hypertensive intraparenchymal hemorrhage are basal ganglia (esp. putamen), thalamus, cerebellum and pons.

581 Out of the following, which is the most common site for hypertensive intraparenchymal hemorrhage ?

Harrison's 18th Ed. 3294

- A. Thalamus
- B. Putamen
- C. Caudate nucleus
- D. Globus pallidus

Putamen is the most common site for hypertensive intraparenchymal hemorrhage.

582 In hypertensive intraparenchymal hemorrhage, if blood dissects into the ventricular space, the morbidity ?

Harrison's 18th Ed. 3294

- A. Remains the same
- B. Increases
- C. Decreases
- D. Any of the above

In hypertensive intraparenchymal hemorrhage, blood may dissect into the ventricular space which substantially 'increases' morbidity and may cause hydrocephalus.

583 Most hypertensive intraparenchymal hemorrhages develop over what period of time ?

Harrison's 18th Ed. 3294

- A. 1 to 10 minutes
- B. 10 to 30 minutes
- C. 30 to 90 minutes
- D. 90 to 180 minutes

Most hypertensive intraparenchymal hemorrhages develop over 30 to 90 minutes.

584 Which of the following statements about intracerebral hemorrhages is false ?

Harrison's 18th Ed. 3294

- A. Almost always occur in awake state
- B. Abrupt onset of focal neurologic deficit
- C. Seizures are common
- D. Focal deficit worsens steadily over 30 to 90 minutes

Intracerebral hemorrhages almost always occur in awake state. Hemorrhage presents as abrupt onset of focal neurologic deficit. Seizures are uncommon. Focal deficit worsens steadily over 30-90 minutes with a diminishing level of consciousness & signs of raised ICP (headache/vomiting).

585 In hypertensive putaminal hemorrhage, the eyes deviate towards which side ?

Harrison's 18th Ed. 3295

- A. Away from the side of hemiparesis
- B. Towards the side of hemiparesis
- C. Remain in the center
- D. Rotate upwards

In putaminal hypertensive hemorrhage, contralateral hemiparesis is the sentinel sign. Eyes deviate away from the side of hemiparesis.

586 In hypertensive intraparenchymal hemorrhage, if there is a downward & inward deviation of eyes, the location of hemorrhage is in ?
Harrison's 18th Ed. 3295

A. Putamen
B. Thalamus
C. Pons
D. Cerebellum

Thalamic hemorrhages may extend inferiorly into upper midbrain and cause deviation of eyes downward and inward.

587 In thalamic hemorrhage, which of the following sensory modality is affected ?
Harrison's 18th Ed. 3295

A. Exteroceptive
B. Proprioceptive
C. Cortical
D. All of the above

Thalamic hemorrhages also produce contralateral hemiplegiadue to involvement of adjacent internal capsule. Prominent sensory deficit involving all modalities is usually present.

588 Which of the following is true in thalamic hemorrhage ?
Harrison's 18th Ed. 3295

A. Unequal pupils with absence of light reaction
B. Absence of convergence
C. Ipsilateral Horner's syndrome
D. All of the above

Thalamic hemorrhages by extension inferiorly into upper midbrain may lead to homonymous visual field defect, unequal pupils with absence of light reaction, skew deviation with eye opposite hemorrhage displaced downward & medially, ipsilateral Horner's syndrome, absence of convergence, paralysis of vertical gaze, and retraction nystagmus.

589 In hypertensive intraparenchymal hemorrhage, if there is impairment of doll's head or oculocephalic maneuver, the location of hemorrhage is in ?
Harrison's 18th Ed. 3295

A. Putamen
B. Thalamus
C. Pons
D. Cerebellum

In pontine hemorrhages, there is impairment of reflex horizontal eye movements evoked by head turning (doll's head or oculocephalic maneuver).

590 Excessive sweating (hyperhidrosis) is a feature of which of the following CVA's ?
Harrison's 18th Ed. 3295

A. Basal ganglia hemorrhage
B. Thalamic hemorrhage
C. Pontine hemorrhage
D. Cerebellar hemorrhage

Presentation of pontine hemorrhage include sudden onset, pinpoint pupils (1 mm) reactive to light, loss of reflex eye movements and corneal responses, ocular bobbing, posturing, hyperventilation, severe hypertension and excessive sweating.

591 Decerebrate rigidity is most frequent which of the following hypertensive intraparenchymal hemorrhage ?
Harrison's 18th Ed. 3295

A. Basal ganglia hemorrhage

- B. Thalamic hemorrhage
C. Pontine hemorrhage
D. Cerebellar hemorrhage

In pontine hemorrhages, deep coma with quadriplegia usually occurs over a few minutes with prominent decerebrate rigidity.

592 Cerebellar hemorrhages are characterized by ?
Harrison's 18th Ed. 3295

A. Occipital headache
B. Repeated vomiting
C. Ataxia of gait
D. All of the above

Cerebellar hemorrhages develop over several hours & are characterized by occipital headache, repeated vomiting, and ataxia of gait.

593 In mild cases of cerebellar hemorrhage, there may be no other neurologic signs other than ?
Harrison's 18th Ed. 3295

A. Gait ataxia
B. Occipital headache
C. Repeated vomiting
D. Seizure

In mild cases of cerebellar hemorrhage, there may be no other neurologic signs other than gait ataxia.

594 Which of the following about cerebellar hemorrhage is false ?
Harrison's 18th Ed. 3295

A. Forced deviation of eyes to opposite side
B. Paresis of conjugate lateral gaze toward side of hemorrhage
C. Usually develop over several hours
D. None of the above

In cerebellar hemorrhage, dizziness or vertigo may be prominent. There is paresis of conjugate lateral gaze toward the side of hemorrhage, forced deviation of eyes to opposite side, or an ipsilateral sixth nerve palsy.

595 Which of the following lobar hemorrhage causes arm weakness ?
Harrison's 18th Ed. 3295

A. Occipital hemorrhage
B. Left temporal hemorrhage
C. Parietal hemorrhage
D. Frontal hemorrhage

Major neurologic deficit with occipital hemorrhage is hemianopia, with left temporal hemorrhage it is aphasia and delirium, with parietal hemorrhage it is hemisensory loss and with frontal hemorrhage it is arm weakness.

596 Which of the following is uncommon in lobar hemorrhages ?
Harrison's 18th Ed. 3295

A. Focal headaches
B. Vomiting
C. Drowsiness
D. Stiff neck

Most patients with lobar hemorrhages have focal headaches and more than half vomit or are drowsy. Stiff neck and seizures are uncommon.

597 Which of the following is mainly affected in cerebral amyloid angiopathy ?
Harrison's 18th Ed. 3295

A. Arterioles

- B. Venules
- C. Capillaries
- D. All of the above

598 Cerebral amyloid angiopathy affects mainly ?

Harrison's 18th Ed. 3295

- A. Children
- B. Adults
- C. Elderly
- D. All of the above

Cerebral amyloid angiopathy is a disease of the elderly in which arteriolar degeneration occurs and amyloid is deposited in the walls of the cerebral arteries.

599 Cerebral amyloid angiopathy cause which of the following ?

Harrison's 18th Ed. 3295

- A. Intraparenchymal hemorrhage
- B. Lobar hemorrhage
- C. Cerebellar hemorrhage
- D. Subarachnoid hemorrhage

Cerebral amyloid angiopathy causes both single and recurrent lobar hemorrhages and is the most common cause of lobar hemorrhage in elderly.

600 Intracranial hemorrhages associated with anticoagulant therapy occur in ?

Harrison's 18th Ed. 3295

- A. Lobar hemorrhage
- B. Thalamic hemorrhage
- C. Pontine hemorrhage
- D. Any location

Intracranial hemorrhages associated with anticoagulant therapy & hematologic disorders can occur at any location and may present as multiple intracerebral hemorrhages. Skin and mucous membrane bleeding is usually evident and offers a diagnostic clue.

601 Which of the following is a cause of stroke in young ?

Harrison's 18th Ed. 3295

- A. Cocaine use
- B. Moyamoya disease
- C. Dissection of the internal carotid or vertebral arteries
- D. All of the above

602 Which of the following worsens the prognosis in intracerebral hemorrhage ?

Harrison's 17th Ed. 2534

- A. Extension into the ventricular system
- B. Advanced age
- C. Location within the posterior fossa
- D. All of the above

Extension into ventricular system, advanced age, location within posterior fossa & depressed level of consciousness at initial presentation worsens prognosis in intracerebral hemorrhage.

603 Which is the agent of first choice in reversing warfarin induced coagulopathy in intracerebral hemorrhage ?

Harrison's 18th Ed. 3298

- A. Prothrombin complex concentrate infusion
- B. Fresh-frozen plasma
- C. Vitamin K

- D. Any of the above

Agent of first choice in reversing warfarin induced coagulopathy in intracerebral hemorrhage is prothrombin complex concentrate followed by fresh-frozen plasma & vitamin K.

604 What volume of supratentorial hematomas due to hypertensive intracerebral hemorrhage have a good prognosis ?

Harrison's 17th Ed. 2534

- A. < 30 mL
- B. < 60 mL
- C. < 90 mL
- D. < 120 mL

605 What volume of supratentorial hematomas due to hypertensive intracerebral hemorrhage have a poor prognosis ?

Harrison's 16th Ed. 2392

- A. > 10 mL
- B. > 25 mL
- C. > 40 mL
- D. > 60 mL

Volume and location of hematoma determine prognosis. Supratentorial hematomas due to hypertensive intracerebral hemorrhage with volumes <30 mL have a good prognosis 30 to 60 mL, an intermediate prognosis and >60 mL, a poor prognosis during initial hospitalization.

606 What diameter of cerebellar hematoma will require surgical evacuation ?

Harrison's 18th Ed. 3298

- A. > 0.5 cm
- B. > 1.5 cm
- C. > 2 cm
- D. > 3 cm

Most cerebellar hematomas >3 cm in diameter require surgical evacuation.

607 Which of the following is not helpful for the edema from intracerebral hematoma ?

Harrison's 18th Ed. 3298

- A. Glucocorticoids
- B. Osmotic agents
- C. Induced hyperventilation
- D. Ventriculostomy

Glucocorticoids are not helpful for the edema from intracerebral hematoma.

608 Largest AVMs are most frequently found in ?

Harrison's 18th Ed. 3298

- A. Anterior half of hemispheres
- B. Posterior half of hemispheres
- C. Brainstem
- D. Spinal cord

Largest AVMs are found most frequently in posterior half of hemispheres. They may also be found in brainstem and spinal cord.

609 Bleeding or other symptoms from AVMs are most common between the ages of ?

Harrison's 18th Ed. 3298

- A. 1 and 10 years
- B. 10 and 30 years
- C. 30 and 50 years

D. 50 and 75 years

Bleeding or other symptoms from AVMs are most common between the ages of 10 & 30 years.

610 Which of the following statements about AVM bleed is false ?

Harrison's 18th Ed. 3298

- A. Hemorrhage is mainly intraparenchymal
- B. Symptomatic cerebral vasospasm is rare
- C. Smaller lesions have a higher hemorrhage rate
- D. MRI is gold standard for evaluating anatomy of AVM

Hemorrhage is mainly intraparenchymal. Symptomatic cerebral vasospasm is rare. Smaller lesions have a higher hemorrhage rate. Conventional x-ray angiography is the gold standard for evaluating precise anatomy of AVM.

611 Which of the following is a common location of capillary telangiectasias in brain ?

Harrison's 18th Ed. 3298

- A. Pons
- B. Mid brain
- C. Medulla oblongata
- D. Cerebellum

Capillary telangiectasias are true capillary malformations located typically in pons and deep cerebral white matter as in hereditary hemorrhagic telangiectasia (Osler-Rendu-Weber) syndrome. Bleeding rarely produces mass effect or significant symptoms.

612 Intracranial hemorrhage located usually in brainstem is due to which of the following ?

Harrison's 18th Ed. 3298

- A. Hypertensive hemorrhage
- B. Cocaine abuse
- C. Capillary telangiectasias
- D. Arteriovenous malformation

Capillary telangiectasias are true capillary malformations in normal brain structure. Pons & deep cerebral white matter are typical locations. Hereditary hemorrhagic telangiectasia (Osler-Rendu-Weber) syndrome is an example.

613 Intracranial hemorrhage due to a coagulopathy occurs in which of the following locations ?

Harrison's 18th Ed. 3298

- A. Subarachnoid
- B. Intraparenchymal
- C. Basal ganglion
- D. Any of the above

Intracranial hemorrhages associated with anticoagulant therapy can occur at any location. Anticoagulant-related intracerebral hemorrhages evolve slowly over 24 to 48 hours. Skin and mucous membrane bleeding is usually evident and offers a diagnostic clue.

614 Which of the following is not an acquired vascular lesions ?

Harrison's 18th Ed. 3299

- A. Dural arteriovenous fistulas
- B. Cavernous angiomas
- C. Capillary telangiectasias
- D. None of the above

Capillary telangiectasias are true capillary malformations. Dural AV fistulas are acquired connections from a dural artery to dural sinus. Cavernous angiomas are tufts of capillary sinusoids in deep hemispheric white matter & brainstem with no normal intervening neural structures.

615 Which of the following gene is responsible in causing cavernous angiomas ?

Harrison's 18th Ed. 3299, N Engl J Med 2002;347:1711

- A. NOTCH3
- B. APP
- C. BRI
- D. KRIT1

KRIT1 and CCM2 have been identified as genes causing cavernous angiomas.

616 Which of the following genes can cause autosomal dominant amyloid angiopathies ?

N Engl J Med 2002;347:1711

- A. APP
- B. CST3
- C. BRI
- D. All of the above

APP, CST3, BRI genes cause autosomal dominant amyloid angiopathies.

617 Primary class of antibody that is associated with antiphospholipid antibody syndrome is ?

Harrison's 16th Ed. 1964

- A. Anticardiolipin antibodies
- B. Lupus anticoagulant
- C. Antibodies against B2G1
- D. All of the above

618 Thrombotic events associated with antiphospholipid antibodies include ?

Harrison's 16th Ed. 1964

- A. Deep vein thrombosis (DVT)
- B. Pulmonary embolus
- C. Placental vascular thrombosis
- D. All of the above

619 The lupus anticoagulants prolong which of the following coagulation test results ?

Disease-a-Month 2003;49:696-741

- A. Activated partial thromboplastin time (aPTT)
- B. Prothrombin time
- C. Dilute Russell viper venom time (dRVVT)
- D. All of the above

620 Which of these is a natural anticoagulant ?

Disease-a-Month 2003;49:696-741

- A. Beta₂-Gp1
- B. Activated protein C
- C. Annexin V
- D. All of the above

621 Sneddon syndrome consists of ?

Disease-a-Month 2003;49:696-741

- A. Stroke
- B. Livido reticularis
- C. Hypertension
- D. All of the above

- 622 **Obstetric complications in antiphospholipid syndrome are usually seen at ?**
Disease-a-Month 2003;49:696-741
A. 10 or more weeks of gestation
B. 8 or more weeks of gestation
C. 6 or more weeks of gestation
D. 4 or more weeks of gestation
- 623 **Which of the following is the preferred test for diagnosis of antiphospholipid antibody ?**
Disease-a-Month 2003;49:696-741
A. aPTT
B. KCT
C. dRVVT
D. Bleeding time
- 624 **Antiphospholipid syndrome is a disorder characterized by ?**
Disease-a-Month 2003;49:696-741
A. Recurrent arterial thrombosis
B. Spontaneous abortions
C. Thrombocytopenia
D. All of the above

Subarachnoid hemorrhage (SAH)

- 625 **Which of the following is false about idiopathic SAHs localized to perimesencephalic cisterns ?**
Harrison's 17th Ed. 1726
A. Benign
B. Venous or capillary source
C. Angiography is unrevealing
D. None of the above

Some idiopathic SAHs are localized to perimesencephalic cisterns and are benign with a venous or capillary source. Angiography is unrevealing.

- 626 **Which of the following is the most common cause of SAH ?**
Harrison's 17th Ed. 1726
A. Rupture of a saccular aneurysm
B. Bleeding from a vascular anomaly
C. Extension into subarachnoid space from a primary intracerebral hemorrhage
D. Idiopathic

After head trauma, the most common cause of SAH is rupture of a saccular aneurysm.

- 627 **What percentage of adults harbor intracranial aneurysms ?**
Harrison's 17th Ed. 1726
A. 1 %
B. 2 %
C. 3 %
D. 4 %

Autopsy & angiography studies show that ~2% of adults harbor intracranial aneurysms.

- 628 **In SAH, the rate of rebleeding in the first month is about ?**
Harrison's 17th Ed. 1726
A. 20 %

- B. 30 %
C. 40 %
D. 50 %

In SAH, if the patient survives but aneurysm is not obliterated, the rate of rebleeding is about 20% in first 2 weeks, 30% in first month.

- 629 **An aneurysm is termed 'Giant' when its diameter is ?**
Harrison's 17th Ed. 1727
A. > 0.5 cm
B. > 1.0 cm
C. > 1.5 cm
D. > 2.5 cm

Berry aneurysms >2.5 cm in diameter are called giant aneurysms.

- 630 **Most common location of an intracranial aneurysm is ?**
Harrison's 17th Ed. 1727
A. Anterior communicating artery
B. Posterior communicating artery
C. Terminal internal carotid artery
D. Vertebral artery

- 631 **Most common location of an intracranial aneurysm is ?**
Harrison's 17th Ed. 1727
A. Anterior communicating artery
B. MCA bifurcation
C. Posterior communicating artery
D. Middle of basilar artery

- 632 **Most common location of an intracranial aneurysm is ?**
Harrison's 17th Ed. 1727
A. Anterior communicating artery
B. Posterior communicating artery
C. Top of basilar artery
D. Middle of basilar artery

The three most common locations of berry aneurysms are the terminal internal carotid artery, MCA bifurcation, and top of basilar artery.

- 633 **Mycotic aneurysms are best related to ?**
Harrison's 17th Ed. 1727
A. Hypertension
B. Diabetes mellitus
C. Bacterial endocarditis
D. Trauma

Mycotic aneurysms are usually located distal to the first bifurcation of major arteries of the circle of Willis. Most result from infected emboli due to bacterial endocarditis.

- 634 **Mycotic aneurysms are usually located distal to which bifurcation of major arteries of circle of Willis ?**
Harrison's 17th Ed. 1727
A. 1st
B. 2nd
C. 3rd
D. 4th

Mycotic aneurysms due to infected emboli are usually located distal to the first bifurcation of major arteries of the circle of Willis.

635 Anterior circulation accounts for what percentage of all intracranial aneurysms ?

Harrison's 17th Ed. 1727

- A. 25 %
- B. 45 %
- C. 65 %
- D. 85 %

~85 % of aneurysms occur in the anterior circulation, mostly on the circle of Willis.

636 What percentage of all intracranial aneurysms are multiple ?

Harrison's 17th Ed. 1727

- A. 5 %
- B. 10 %
- C. 20 %
- D. 40 %

~20% of patients have multiple aneurysms, many at mirror sites bilaterally.

637 Which of the following characteristics of a berry aneurysm make it at greater risk of rupture ?

Harrison's 17th Ed. 1727

- A. >7 mm in diameter
- B. At the top of basilar artery
- C. At the origin of posterior communicating artery
- D. Any of the above

Those >7 mm in diameter and those at the top of the basilar artery and at the origin of the posterior communicating artery are at greater risk of rupture.

638 The site of rupture of a berry aneurysm is ?

Harrison's 17th Ed. 1727

- A. Base of the neck
- B. Top of the neck
- C. Dome
- D. Any of the above

The site of rupture of a berry aneurysm most often is the dome.

639 Patients first complaint upon regaining consciousness in SAH is ?

Harrison's 17th Ed. 1727

- A. Blurred vision
- B. Headache
- C. Thirst
- D. Nausea

Most patients first complain of headache upon regaining consciousness.

640 The location of headache in SAH is ?

Harrison's 17th Ed. 1727

- A. Frontal
- B. Occipital
- C. Temporal
- D. Generalized

In SAH, headache is usually generalized, often with neck stiffness and vomiting.

641 Common deficits that result due to middle cerebral bifurcation aneurysmal rupture include all except ?

Harrison's 17th Ed. 1727

- A. Hemiparesis

- B. Aphasia
- C. Abulia
- D. Acalculia

ACA or MCA bifurcation aneurysms may rupture into adjacent brain or subdural space and form a hematoma large enough to produce mass effect resulting in hemiparesis, aphasia and abulia.

642 III cranial nerve palsy, with pupillary dilatation, loss of ipsilateral light reflex and focal pain above or behind the eye suggests what location of an aneurysm ?

Harrison's 17th Ed. 1727

- A. Posterior communicating artery aneurysm
- B. Aneurysm in the cavernous sinus
- C. Anterior cerebral artery aneurysm
- D. Anterior inferior cerebellar artery aneurysm

643 VI cranial nerve palsy suggests what location of an aneurysm ?

Harrison's 17th Ed. 1727

- A. Posterior communicating artery aneurysm
- B. Aneurysm in the cavernous sinus
- C. Anterior cerebral artery aneurysm
- D. Anterior inferior cerebellar artery aneurysm

644 Occipital and posterior cervical pain suggests what location of an aneurysm ?

Harrison's 17th Ed. 1727

- A. Posterior communicating artery aneurysm
- B. Aneurysm in the cavernous sinus
- C. Anterior cerebral artery aneurysm
- D. Anterior inferior cerebellar artery aneurysm

645 Visual field defects suggests what location of an aneurysm ?

Harrison's 17th Ed. 1727

- A. Posterior communicating artery aneurysm
- B. Aneurysm in the cavernous sinus
- C. Anterior cerebral artery aneurysm
- D. Anterior inferior cerebellar artery aneurysm

646 Occipital and posterior cervical pain suggests what location of an aneurysm ?

Harrison's 17th Ed. 1727

- A. Posterior communicating artery aneurysm
- B. Aneurysm in the cavernous sinus
- C. Anterior cerebral artery aneurysm
- D. Posterior inferior cerebellar artery aneurysm

647 Pain in or behind the eye and in the low temple suggests what location of an aneurysm ?

Harrison's 17th Ed. 1727

- A. Posterior communicating artery aneurysm
- B. Aneurysm in the cavernous sinus
- C. Anterior cerebral artery aneurysm
- D. MCA aneurysm

III cranial nerve palsy associated with pupillary dilatation, loss of ipsilateral light reflex and focal pain above or behind the eye, may occur with an expanding aneurysm at the junction of posterior communicating artery and internal carotid artery. VI cranial nerve palsy may indicate an aneurysm in cavernous sinus, and visual field defects can occur with an anterior cerebral artery aneurysm. Occipital and posterior cervical pain may signal a posterior inferior cerebellar artery or anterior inferior cerebellar artery aneurysm. Pain in or behind the eye and in the low temple can occur with an expanding MCA aneurysm.

648 'Sentinel bleed' is the term used for small aneurysmal rupture into ?

Harrison's 17th Ed. 1727

- A. Subarachnoid space
- B. White matter
- C. Gray matter
- D. Thalamus

Aneurysms with small ruptures & leaks of blood into subarachnoid space are sentinel bleeds.

649 'Wide-neck aneurysms' are those in which the ratio of neck diameter to that of the largest dome is ?

N Engl J Med 2006;354:387-96

- A. > 0.2
- B. > 0.3
- C. > 0.4
- D. > 0.5

650 In a case of SAH who also has third-nerve palsy, which artery is possibly involved ?

N Engl J Med 2006;354:387-96

- A. Anterior communicating artery
- B. Posterior communicating artery
- C. Anterior cerebral artery
- D. Middle cerebral artery

651 In a case of SAH who also has bilateral weakness in legs or abulia, which artery is possibly involved ?

N Engl J Med 2006;354:387-96

- A. Anterior communicating artery
- B. Posterior communicating artery
- C. Anterior cerebral artery
- D. Middle cerebral artery

652 In a case of SAH who also has aphasia, hemiparesis, or visuospatial neglect, which artery is possibly involved ?

N Engl J Med 2006;354:387-96

- A. Anterior communicating artery
- B. Posterior communicating artery
- C. Anterior cerebral artery
- D. Middle cerebral artery

653 In a case of SAH who also has retinal and subhyaloid hemorrhage, which artery is possibly involved ?

N Engl J Med 2006;354:387-96

- A. Anterior communicating artery
- B. Posterior communicating artery
- C. Anterior cerebral artery
- D. Any of the above

654 Clinical scale of Hunt and Hess is used in ?

Harrison's 17th Ed. 1727, N Engl J Med 2006;354:387-96

- A. Bacterial meningitis
- B. HIV dementia
- C. Subarachnoid hemorrhage
- D. Multiple sclerosis

Initial clinical manifestations of SAH can be graded by Hunt-Hess or World Federation of Neurosurgical Societies (WFNS) classification.

655 Which of the following is not a cause of delayed neurologic deficit in SAH ?

Harrison's 17th Ed. 1727

- A. Infection
- B. Hydrocephalus
- C. Vasospasm
- D. Hyponatremia

There are four major causes of delayed neurologic deficits in SAH. They are rerupture, hydrocephalus, vasospasm, and hyponatremia.

656 Peak incidence of rerupture of an untreated aneurysm following SAH is within ?

Harrison's 17th Ed. 1727

- A. 1 day
- B. 3 days
- C. 7 days
- D. 14 days

Incidence of rerupture of an untreated aneurysm in the first month following SAH is ~30% with the peak in the first 7 days.

657 Chronic hydrocephalus after SAH manifests as ?

Harrison's 17th Ed. 1727

- A. Gait difficulty
- B. Incontinence
- C. Impaired mentation
- D. All of the above

Chronic hydrocephalus may develop weeks to months after SAH and manifest as gait difficulty, incontinence, or impaired mentation.

658 Delayed vasospasm in SAH is due to ?

Harrison's 17th Ed. 1727

- A. Hypertension
- B. Hyperviscosity
- C. Clotted blood & its breakdown products on artery
- D. All of the above

Delayed vasospasm is due to direct effects of clotted blood & its breakdown products on artery.

659 Signs of cerebral ischemia due to vasospasm following SAH is most often on which day ?

Harrison's 17th Ed. 1727

- A. Day 1
- B. Day 3
- C. Day 7
- D. Day 14

Signs of cerebral ischemia appear 4 to 14 days after SAH, most often at 7 days.

660 In most cases of SAH, focal vasospasm is preceded by ?

Harrison's 17th Ed. 1727

- A. Headache
- B. Seizure
- C. Decline in mental status
- D. Vomiting

In most SAH cases, focal vasospasm is preceded by decline in mental status.

661 Hyponatremia following SAH is due to ?*Harrison's 16th Ed. 2389*

- A. Inappropriate secretion of vasopressin
- B. Secretion of atrial natriuretic factors
- C. Secretion of brain natriuretic factors
- D. All of the above

Hyponatremia following SAH or "cerebral salt-wasting syndrome" develop in first 2 weeks due to inappropriate secretion of vasopressin & secretion of atrial and brain natriuretic peptides. It should not be treated with free-water restriction as this may increase risk of stroke. It clears over 1 to 2 weeks.

662 Incidence of symptomatic vasospasm in MCA & ACA is high when early CT scans show subarachnoid clots of what size in basal cisterns ?*Harrison's 17th Ed. 1728*

- A. > 2 x 3 mm
- B. > 3 x 3 mm
- C. > 4 x 3 mm
- D. > 5 x 3 mm

663 Incidence of symptomatic vasospasm in MCA & ACA is high when early CT scans show blood layer of what thickness in the cerebral fissures ?*Harrison's 17th Ed. 1728*

- A. > 0.1 mm
- B. > 0.25 mm
- C. > 0.6 mm
- D. > 1 mm

High incidence of symptomatic vasospasm in MCA & ACA is observed when early CT scans show subarachnoid clots >5 x 3 mm in basal cisterns or layers of blood >1 mm thick in cerebral fissures. CT scans less reliably predict vasospasm in vertebral, basilar or posterior cerebral arteries.

664 Xanthochromic CSF in SAH usually lasts for ?*Harrison's 17th Ed. 1728*

- A. 1 to 4 days
- B. 1 to 2 weeks
- C. 1 to 3 weeks
- D. 1 to 4 weeks

Xanthochromic CSF in SAH peaks in intensity at 48 hours and lasts for 1 to 4 weeks.

665 Secondary to intracranial hemorrhage, which of the following ECG finding is unusual ?*Harrison's 17th Ed. 1728*

- A. Prolonged QRS complex
- B. Increased QT interval
- C. "Peaked" or deeply inverted symmetric T waves
- D. Serious ventricular dysrhythmias

Prolonged QRS, increased QT interval & prominent "peaked" or deeply inverted symmetric T waves occur secondary to intracranial hemorrhage. Serious ventricular dysrhythmias are unusual.

666 In endovascular treatment of aneurysms, coils are made of ?*Harrison's 17th Ed. 1728, N Engl J Med 2006;354:387-96*

- A. Platinum
- B. Silver
- C. Gold
- D. Steel

Newer endovascular technique involves placing platinum coils within aneurysm via a femoral artery catheter to enhance thrombosis & over time is walled-off from circulation.

667 Intracranial hypertension following aneurysmal rupture occurs secondary to all except ?*Harrison's 17th Ed. 1729*

- A. Subarachnoid blood
- B. Parenchymal hematoma
- C. Systemic hypertension
- D. Loss of vascular autoregulation

Intracranial hypertension following aneurysmal rupture occurs secondary to subarachnoid blood, parenchymal hematoma, acute hydrocephalus, or loss of vascular autoregulation.

668 Which of the following are poor prognostic signs in SAH ?*Harrison's 17th Ed. 1729*

- A. High ICP refractory to treatment
- B. Rerupture of untreated aneurysm in 1st month of SAH
- C. Vasospasm causing symptomatic ischemia & infarction
- D. All of the above

High ICP refractory to treatment is a poor prognostic sign. Rerupture is associated with a 60% mortality and poor outcome. Vasospasm following SAH causes symptomatic ischemia and infarction and is a major cause of delayed morbidity and death.

669 In treatment of SAH, intracranial pressure should be maintained at ?*Harrison's 16th Ed. 1633*

- A. < 5 mm Hg
- B. < 10 mm Hg
- C. < 15 mm Hg
- D. < 20 mm Hg

In general, ICP should be maintained at <20 mm Hg.

670 In treatment of SAH, cerebral perfusion pressure (CPP) should be maintained at ?*Harrison's 17th Ed. 1729*

- A. 30 - 40 mm Hg
- B. 40 - 50 mm Hg
- C. 50 - 60 mm Hg
- D. 60 - 70 mm Hg

In treatment of SAH, cerebral perfusion pressure should be maintained at 60 - 70 mm Hg.

671 Which of the following drugs is most suited to lower raised blood pressure in patients with acute SAH ?*Harrison's 17th Ed. 1729*

- A. Nifedipine
- B. Amlodipine
- C. Nicardipine
- D. Any of the above

672 Which of the following drugs is most suited to lower raised blood pressure in patients with acute SAH ?*Harrison's 17th Ed. 1729*

- A. Labetalol
- B. Esmolol
- C. Nicardipine
- D. Any of the above

Patients with acute SAH should have blood pressure lowered to a normal range with nonvasodilating agents such as nicardipine, labetalol, or esmolol.

673 “Triple-H” therapy in SAH refers to all except ?

Harrison's 17th Ed. 1729

- A. Hypertension
- B. Hemodilution
- C. Hypervolemia
- D. Hyperventilation

“Triple-H” therapy in SAH includes hypertension, hemodilution and hypervolemia and is achieved by volume expansion.

674 In SAH, if symptomatic vasospasm persists despite optimal medical therapy, which drug is then used ?

Harrison's 17th Ed. 1729

- A. Intravenous nitroglycerine
- B. Intraarterial papaverine
- C. EACA
- D. Intravenous phenylephrine

If symptomatic vasospasm persists despite optimal medical therapy, intraarterial vasodilators & percutaneous transluminal angioplasty are considered. Vasodilators like verapamil & nicardipine do not last > 8-24 hours. Intraarterial papaverine is an effective vasodilator, but neurotoxic.

675 Which of the following is a complication of correction of marked hyponatremia of several days' duration ?

Harrison's 16th Ed. 2390

- A. Cortical venous thrombosis
- B. Hydrocephalus
- C. Central pontine myelinolysis
- D. All of the above

Care must be taken not to correct serum sodium too quickly in patients with marked hyponatremia of several days' duration as central pontine myelinolysis may occur.

676 “Pentobarb coma” refers to ?

Harrison's 16th Ed. 1633

- A. Coma due to accidental ingestion of barbiturates
- B. Coma due to barbiturates given for induction of anesthesia
- C. High-dose barbiturates for refractory elevated ICP
- D. Any of the above

High-dose barbiturate therapy for refractory elevated ICP is termed “pentobarb coma”.

677 Emergent treatment of elevated ICP is most quickly achieved by which of the following ?

Harrison's 16th Ed. 1633

- A. Ventriculostomy
- B. Hyperventilation
- C. High-dose barbiturates
- D. Hypothermia

Emergent treatment of elevated ICP is most quickly achieved by intubation and hyperventilation to bring PaCO₂ level to 30-35 mm Hg.

678 Heritable connective-tissue disorders associated with presence of intracranial aneurysm and subarachnoid hemorrhage include ?

N Engl J Med 2006;354:387-96

- A. Polycystic kidney disease
- B. Ehlers–Danlos syndrome (type IV)
- C. Pseudoxanthoma elasticum
- D. All of the above

371 - Dementia

679 Which of the following does not appear in the definition of dementia ?

Harrison's 18th Ed. 3300

- A. Acquired
- B. Deterioration in cognitive abilities
- C. Impairment in activities of daily living
- D. Comorbid diseases

It is defined as an acquired deterioration in cognitive abilities that impairs the successful performance of activities of daily living. The common forms of dementia are progressive.

680 Which of the following is most commonly affected in dementia ?

Harrison's 18th Ed. 3300

- A. Visuospatial ability
- B. Calculation
- C. Memory
- D. Language

Memory is the most common cognitive ability lost with dementia. Other mental faculties like language, visuospatial ability, calculation, judgment and problem solving are also affected. Neuropsychiatric and social deficits may also develop in dementia syndromes resulting in depression, withdrawal, hallucinations, delusions, agitation, insomnia, and disinhibition.

681 Behavior and mood are modulated by which of the following pathway ?

Harrison's 18th Ed. 3300

- A. Noradrenergic pathway
- B. Serotonergic pathway
- C. Dopaminergic pathway
- D. All of the above

Behavior and mood are modulated by noradrenergic, serotonergic, and dopaminergic pathways, while cholinergic signaling is critical for attention and memory functions.

682 Pathological process in Alzheimer's disease (AD) begins in ?

Harrison's 18th Ed. 3300

- A. Entorhinal cortex
- B. Hippocampus
- C. Posterior temporal neocortex
- D. Parietal neocortex

AD begins in entorhinal cortex, then involves hippocampus, posterior temporal & parietal neocortex and eventually causes a relatively diffuse degeneration throughout cerebral cortex.

683 Which of the following is the single strongest risk factor for dementia ?

Harrison's 18th Ed. 3300

- A. Race / ethnicity
- B. Geographical location
- C. Intoxications
- D. Age

The single strongest risk factor for dementia is increasing age.

684 Pseudodementia is best related to ?

Harrison's 18th Ed. 3301 Table 371-1

- A. Depression
- B. Schizophrenia
- C. Conversion reaction

D. HIV

Severely depressed or anxious individuals may appear demented, a phenomenon called pseudodementia. Dementia associated with depression (pseudodementia), schizophrenia, and conversion reaction are potentially reversible while that with HIV is not.

685 Which of the following is not a potentially reversible dementia ?
Harrison's 18th Ed. 3301 Table 371-1

- A. Depression
- B. Normal-pressure hydrocephalus
- C. Dialysis dementia (aluminum)
- D. Alcoholism

Potentially reversible dementias are depression, hydrocephalus, alcohol dependence, subacute combined degeneration, pellagra, Adrenal insufficiency and Cushing's syndrome, due to drug, medication, and narcotic poisoning.

686 Which of the following can predict progression from mild cognitive impairment (MCI) to Alzheimer's disease (AD) ?
Harrison's 18th Ed. 3300

- A. Diffuse white matter disease
- B. Ventricular system dilatation
- C. Hippocampal atrophy
- D. Subdural effusion

In neuroimaging studies, factors that predict progression from MCI to AD include a memory deficit >1.5 SD from normal, family history of dementia, presence of an apolipoprotein4 (Apo4) and small hippocampal volumes + posterior-predominant cortical atrophy.

687 Rapid progression of dementia with motor rigidity & myoclonus suggests ?
Harrison's 18th Ed. 3301

- A. Alzheimer's disease
- B. Frontotemporal dementia
- C. Cortical basal degeneration
- D. Creutzfeldt-Jakob disease

Rapid progression of dementia in association with diffuse motor rigidity, akinetic-mute state & startle-sensitive myoclonus suggests CJD.

688 Rapid progression of the dementia with motor rigidity & myoclonus suggests which of the following ?
Harrison's 18th Ed. 3301

- A. Alzheimer's disease
- B. Prion disease
- C. Frontotemporal dementia
- D. Parkinson's disease

Rapid progression of dementia with motor rigidity & myoclonus suggests a prion disease.

689 Unexplained falls is a feature of ?
Harrison's 18th Ed. 3303

- A. Alzheimer's disease
- B. Frontotemporal dementia
- C. Cortical basal degeneration
- D. Progressive supranuclear palsy

Progressive supranuclear palsy (PSP) is associated with unexplained falls, axial rigidity, dysphagia, and vertical gaze deficits.

690 Dementia with peripheral neuropathy suggests ?
Harrison's 18th Ed. 3303

- A. Vitamin B12 deficiency

- B. Thyroid dysfunction
- C. Lyme disease
- D. All of the above

Dementia with a peripheral neuropathy suggests vitamin B12 deficiency, heavy metal intoxication, thyroid dysfunction, Lyme disease, or vasculitis.

691 In Mini Mental Status Examination (MMSE), scoring is done out of ?
Harrison's 18th Ed. 3303 Table 371-5

- A. 20
- B. 30
- C. 40
- D. 50

Mini-mental status examination (MMSE) is a brief screening tool to confirm the presence of cognitive impairment & to follow progression of dementia. It is a 30-point test of cognitive function.

692 MMSE contains tests for ?
Harrison's 18th Ed. 3303 Table 371-5

- A. Orientation
- B. Working memory
- C. Episodic memory
- D. All of the above

MMSE contains tests of orientation, working memory (spell world backwards), episodic memory (orientation & 3-word recall), language comprehension, naming, and figure copying.

693 MMSE is named after ?
Harrison's 18th Ed. 3303

- A. Samuels
- B. Blumenthal
- C. Campbell
- D. Folstein

Folstein mini-mental status examination (MMSE) is an easy, standardized screening examination of cognitive function esp. working and episodic memory. The test is 85% sensitive and 85% specific for the diagnosis of dementia.

694 Mini Mental Status Examination (MMSE) provides information regarding ?
Harrison's 18th Ed. 198-199

- A. Orientation
- B. Language
- C. Visuospatial skills
- D. All of the above

Mini Mental Status Examination (MMSE) can provide information regarding orientation, language, and visuospatial skills.

695 Cognitive domain includes which of the following ?
Harrison's 18th Ed. 196

- A. Memory
- B. Executive function
- C. Visuospatial tasks
- D. All of the above

Cognitive domains include memory, executive function, visuospatial tasks and language.

696 Which of the following is best related to visuospatial disorientation ?
Harrison's 18th Ed. 239

- A. Optic ataxia

- B. Ocular apraxia
- C. Simultanagnosia
- D. All of the above

Bilateral parietal lesions produce Bálint’s syndrome, which is characterized by impaired eye-hand coordination (optic ataxia), difficulty initiating voluntary eye movements (ocular apraxia), and visuospatial disorientation (simultanagnosia).

697 Which of the following is not a major type of memory ?
Harrison’s 16th Ed. 2393

- A. Working
- B. Sequential
- C. Episodic
- D. Remote

Memory is divided into three major types - working, episodic, and remote.

698 Working memory lasts for what duration ?
Harrison’s 16th Ed. 2393

- A. < 5 seconds
- B. < 10 seconds
- C. < 20 seconds
- D. < 30 seconds

Working memory lasts for <30 seconds.

699 Which of the following types of memory is tested by asking the patient to recall digits backwards ?
Harrison’s 16th Ed. 2393

- A. Working
- B. Episodic
- C. Remote
- D. All of the above

Working memory is highly vulnerable to distraction, requiring attention and vigilance for its maintenance. It is tested by asking the patient to recall digits backwards.

700 Which of the following is false about “Digit span forward” test ?
Harrison’s 18th Ed. Chapter e9

- A. Test of attention
- B. Normal capacity is six numbers
- C. Asking patient to repeat digits in same order told
- D. None of the above

701 Which of the following is false about “Digit span backward” test ?
Harrison’s 18th Ed. Chapter e9

- A. Test of working memory
- B. Normal capacity is five numbers
- C. Asking patient to repeat digits in reverse order
- D. None of the above

Most common bedside test of working memory involves asking patients to repeat a series of digits orally, with the clinician gradually increasing the number of to-be-retained digits. Asking the patient to repeat digits in the same order as they were delivered is called digit span forward which is a test of attention. Clinician may also ask the patient to repeat digits in reverse order. This is called digit span backward which is a test of working memory. Capacity for digit span forward is typically six numbers, while normal adults can generally repeat five digits backward.

702 Which of the following types of memory is tested by asking the patient to recall three words after 3 to 5 minutes?
Harrison’s 16th Ed. 2394

- A. Working

- B. Episodic
- C. Remote
- D. All of the above

Episodic memory is tested by asking a patient to recall three words after 3 to 5 minutes.

703 Hippocampal complex is critical for which of the following types of memory ?
Harrison’s 16th Ed. 2394

- A. Working
- B. Episodic
- C. Remote
- D. All of the above

Hippocampal complex is critical for episodic memory, and physiologic changes in synapses in this brain region accompany new episodic memories.

704 More permanent stores of words, dates, historic facts or names require which of the following ?
Harrison’s 16th Ed. 2394

- A. Hippocampal complex
- B. Left anterior temporal cortex
- C. Prefrontal lobe
- D. Parietal lobe

More permanent stores of words, dates, facts or names require left anterior temporal cortex.

705 Most common cognitive deficits that follow seizures, hypoglycemia, hypoxia is ?
Harrison’s 16th Ed. 2394

- A. Working memory deficits
- B. Episodic memory deficits
- C. Remote memory deficits
- D. None of the above

Hippocampal complex is vulnerable to metabolic insults such as seizures, hypoglycemia, hypoxia, and neurodegenerative processes, which explains why episodic memory deficits are the most common cognitive deficits that follow these disorders.

706 The process of memory retrieval requires which of the following cerebral lobes ?
Harrison’s 16th Ed. 2394

- A. Frontal lobe
- B. Temporal lobe
- C. Parietal lobe
- D. All of the above

The process of memory encoding is dependent upon frontal lobes and hippocampal complex, while the process of retrieval requires frontal lobes.

707 Memory function includes which of the following ?
Harrison’s 16th Ed. 2394

- A. Registration (encoding or acquisition)
- B. Retention (storage or consolidation)
- C. Retrieval (decoding or recall)
- D. All of the above

Memory function includes registration (encoding or acquisition), retention (storage or consolidation), stabilization (consolidation), and retrieval (decoding or recall).

708 The basal ganglia, cerebellum, and supplementary motor area are critical for ?

Harrison's 16th Ed. 2394

- A. Episodic memory
- B. Semantic memory
- C. Procedural memory
- D. Working memory

Procedural (implicit) memory involves centers outside the hippocampus such as amygdala, basal ganglia, cerebellum, and sensory cortex.

709 The medial temporal lobes, including the hippocampus and parahippocampus, are critical for ?

N Engl J Med 2005;352:692-9

- A. Episodic memory
- B. Semantic memory
- C. Procedural memory
- D. Working memory

Episodic memory requires dorsomedial nucleus of thalamus and medial temporal lobes.

710 Which of the following is damaged in Korsakoff's syndrome due to thiamine deficiency ?

Harrison's 16th Ed. 2394

- A. Dorsomedial nucleus of thalamus
- B. Medial temporal lobes
- C. Amygdala
- D. Basal ganglia

Dorsomedial nucleus of thalamus is damaged in Korsakoff's syndrome due to thiamine deficiency resulting in loss of episodic memory.

711 Inferolateral temporal lobes are critical for ?

N Engl J Med 2005;352:692-9

- A. Episodic memory
- B. Semantic memory
- C. Procedural memory
- D. Working memory

712 Prefrontal cortex, Broca's area, Wernicke's area are critical for ?

N Engl J Med 2005;352:692-9

- A. Episodic memory
- B. Semantic memory
- C. Procedural memory
- D. Phonologic working memory

713 Prefrontal cortex, visual-association areas are critical for ?

N Engl J Med 2005;352:692-9

- A. Episodic memory
- B. Semantic memory
- C. Procedural memory
- D. Spatial working memory

714 Which memory is involved in remembering unchanging facts, principles & rules (number of days in a week) ?

Harrison's 16th Ed. 2394

- A. Semantic memory
- B. Declarative (explicit) memory
- C. Procedural (implicit) memory
- D. All of the above

Semantic memory contains unchanging facts, principles, associations, and rules (number of days in a week). Injury to anterior temporal neocortex leads to loss of semantic memory.

715 Which kind of memory is involved in remembering facts about the world and past personal events ?

Harrison's 16th Ed. 2394

- A. Semantic memory
- B. Declarative (explicit) memory
- C. Procedural (implicit) memory
- D. All of the above

Declarative (explicit) memory refers to facts about world & past personal events that must be consciously retrieved to be remembered. Episodic is prototypical declarative explicit memory.

716 Which kind of memory is involved in learning and retaining a skill or procedure like riding a bicycle, getting dressed, or driving a car?

Harrison's 16th Ed. 2394

- A. Semantic memory
- B. Declarative (explicit) memory
- C. Procedural (implicit) memory
- D. All of the above

Procedural (implicit) memory is involved in learning and retaining a skill or procedure such as riding a bicycle, getting dressed, or driving a car. Abilities stored in procedural memory become automatic and do not require conscious implementation.

717 Executive memory function is highly dependent upon which of the following ?

Harrison's 16th Ed. 2394

- A. Working
- B. Episodic
- C. Remote
- D. All of the above

Executive function refers to mental activity involved in planning, initiating, and regulating behavior. It is highly dependent upon working memory.

718 Which of the following is not a part of the components of medial temporal lobe memory system ?

Harrison's 16th Ed. 2394

- A. Hippocampus
- B. Amgdala
- C. Entorhinal region
- D. Perirhinal region

Components of medial temporal lobe memory system include hippocampus and adjacent cortex, including the entorhinal, perirhinal, and parahippocampal regions.

719 In AD the early deficits involve which class of memory ?

Harrison's 18th Ed. 3304

- A. Working memory
- B. Episodic memory
- C. Executive function
- D. Language

In AD the early deficits involve verbal or visual episodic memory, category generation ("name as many animals as you can in one minute"), and visuoconstructive ability. Tasks requiring patient to recall a long list of words or a series of pictures after a predetermined delay will demonstrate deficits.

720 An autosomal dominant family history of dementia can be found in which of the following ?

Harrison's 18th Ed. 3303

- A. Huntington's disease
- B. Alzheimer's disease
- C. Frontotemporal dementia
- D. All of the above

An autosomal dominant family history is found in HD and in familial forms of AD, FTD, DLB, or prion disorders.

721 Early presence of visual hallucinations is a feature of which of the following dementias ?

Harrison's 18th Ed. 3303

- A. Creutzfeldt-Jakob disease
- B. Schizophrenia
- C. Frontotemporal dementia
- D. Dementia with Lewy bodies

Diagnosis of DLB is suggested by early presence of visual hallucinations, parkinsonism, delirium, rapid-eye-movement (REM) sleep disorder or Capgras syndrome (delusion that a familiar person has been replaced by an impostor).

722 Capgras syndrome is an early feature in which of the following degenerative diseases ?

Harrison's 18th Ed. 3303, Table 371-4

- A. Alzheimer's disease
- B. Creutzfeldt-Jakob disease
- C. Frontotemporal dementia
- D. Dementia with Lewy bodies

Capgras syndrome - delusion that a familiar person has been replaced by an impostor, is an early feature of Dementia with Lewy bodies.

723 Early prominent gait disturbance is a feature of ?

Harrison's 18th Ed. 3306

- A. Alzheimer's disease
- B. Dementia with Lewy bodies
- C. Creutzfeldt-Jakob disease
- D. Vascular dementia

Early prominent gait disturbance with only mild memory loss suggests vascular dementia. Gait disturbance is common in vascular dementia, PD/DLB, or normal-pressure hydrocephalus (NPH).

724 On neuroimaging studies, extensive white matter abnormalities correlate best with ?

Harrison's 18th Ed. 3304

- A. Alzheimer's disease
- B. Frontotemporal dementia
- C. Vascular etiology
- D. Creutzfeldt-Jakob disease

On neuroimaging studies, extensive white matter abnormalities correlate best with a vascular etiology for dementia.

725 In amyloid imaging of brain for diagnosis of Alzheimer's disease (AD), which of the following is used ?

Harrison's 18th Ed. 3304

- A. Pittsburgh Compound-A
- B. Pittsburgh Compound-B
- C. Pittsburgh Compound-C

D. Pittsburgh Compound-D

Amyloid imaging with radioligands like Pittsburgh Compound-B (PiB) and ¹⁸F-AV-45 help in detecting brain amyloid associated with amyloid angiopathy or neuritic plaques of AD.

726 EEG is helpful in the diagnosis of which of the following ?

Harrison's 18th Ed. 3305

- A. Alzheimer's disease
- B. Frontotemporal dementia
- C. Cortical basal degeneration
- D. Creutzfeldt-Jakob disease

Electroencephalogram (EEG) is rarely helpful except in CJD (repetitive bursts of diffuse high-amplitude sharp waves, or "periodic complexes").

727 Which of the following is the major source of cholinergic input to the cerebral cortex ?

Harrison's 16th Ed. 2394

- A. Globus pallidus
- B. Thalamus
- C. Nucleus accumbens
- D. Nucleus basalis of Meynert

Nucleus basalis of Meynert is the major source of cholinergic input to the cerebral cortex.

728 Agents useful for reducing the signs of dementia include ?

N Engl J Med 2004;351:56-67

- A. Donepezil
- B. Rivastigmine
- C. Galantamine
- D. All of the above

729 Which of the following drugs used in management of dementia is not a cholinesterase inhibitor ?

N Engl J Med 2004;351:56-67

- A. Donepezil
- B. Rivastigmine
- C. Galantamine
- D. Memantine

730 Which of the following drugs used in the management of dementia is a NMDA-receptor antagonist ?

N Engl J Med 2004;351:56-67

- A. Donepezil
- B. Rivastigmine
- C. Galantamine
- D. Memantine

731 Ribot's law states that ?

N Engl J Med 2005;352:692-9

- A. Events just before ictus are most vulnerable to dissolution
- B. Remote memories are most resistant
- C. A+B
- D. None of the above

732 The most common clinical disorder disrupting semantic memory is ?

N Engl J Med 2005;352:692-9

- A. Alzheimer's disease

- B. Parkinsons's disease
- C. Multiple sclerosis
- D. Progressive supranuclear palsy

733 Disorders affecting procedural memory include all except ?

N Engl J Med 2005;352:692-9

- A. Alzheimer's disease
- B. Parkinsons's disease
- C. Huntington's disease
- D. Olivopontocerebellar degeneration

Alzheimer's disease

734 Alois Alzheimer belonged to which nation ?

- A. Spain
- B. Germany
- C. Poland
- D. Sweden

Alzheimer's disease (AD) was first described by German psychiatrist Alois Alzheimer (14 June 1864 - 19 December 1915) in a patient at Frankfurt asylum named Mrs. Auguste Deter.

735 Which of the following President of United States of America suffered from Alzheimer's disease ?

- A. Richard Nixon
- B. Lyndon B. Johnson
- C. Gerald Ford
- D. Ronald Reagan

736 What percentage of mild cognitive impairment individuals will progress to Alzheimer's disease (AD) in 4 years ?

Harrison's 18th Ed. 3305

- A. ~ 20 %
- B. ~ 30 %
- C. ~ 40 %
- D. ~ 50 %

Approximately 50% of patients with mild cognitive impairment (MCI) will progress to AD over 4 years (roughly 12% per year).

737 Cognitive changes of AD characteristically begin with ?

Harrison's 18th Ed. 3305

- A. Memory impairment
- B. Language deficit
- C. Visuospatial deficit
- D. Any of the above

Cognitive changes of AD follow a characteristic pattern, beginning with memory impairment and going on to language and visuospatial deficits.

738 Term mild cognitive impairment (MCI) is applied when memory loss falls how many standard deviations below normal on standardized memory tests ?

Harrison's 18th Ed. 3305

- A. 0.5
- B. 1.0
- C. 1.5

D. 2.0

Term mild cognitive impairment (MCI) is applied when memory loss falls 1.5 standard deviations below normal on standardized memory tests.

739 In the middle stages of AD, which of the following remains intact ?

Harrison's 18th Ed. 3305

- A. Social graces
- B. Routine behavior
- C. Superficial conversation
- D. All of the above

In middle stages of AD, social graces, routine behavior, and superficial conversation may remain surprisingly intact.

740 Which of the following is rare in AD ?

Harrison's 18th Ed. 3305

- A. Hyperactive tendon reflexes
- B. Myoclonic jerks
- C. Resting tremor
- D. Delusion

Patients of AD often look parkinsonian but rarely have a high-amplitude, rhythmic, resting tremor.

741 The typical duration of Alzheimer's disease is ?

Harrison's 18th Ed. 3305

- A. 2 - 3 years
- B. 4 - 6 years
- C. 6 - 8 years
- D. 8 - 10 years

The typical duration of AD is 8 to 10 years, but the course can range from 1 to 25 years.

742 Neuroimaging studies in AD may show atrophy in ?

Harrison's 18th Ed. 3305

- A. Medial temporal lobes
- B. Lateral and medial parietal lobes
- C. Lateral frontal cortex
- D. All of the above

In AD, neuroimaging studies (CT and MRI) show atrophy is distributed throughout the medial temporal lobes, as well as lateral and medial parietal lobes and lateral frontal cortex.

743 Risk factors for AD are ?

Harrison's 18th Ed. 3306

- A. Old age
- B. Positive family history
- C. Female gender
- D. All of the above

Risk factors for AD are old age, positive family history, female gender, past history of head trauma with concussion, very low educational attainment, exposure to aluminum, mercury & viruses, elevated homocysteine & cholesterol levels, hypertension, diminished serum folic acid, low dietary intake of fruits, vegetables, red wine & diabetes. Use of NSAID's reduces risk of AD.

744 Most severe pathology in Alzheimer's disease is found in ?

Harrison's 18th Ed. 3306

- A. Hippocampus
- B. Temporal cortex
- C. Nucleus basalis of Meynert
- D. All of the above

Most severe pathology is found in hippocampus, temporal cortex & nucleus basalis of Meynert (lateral septum), the last being a major source of cholinergic input to cerebral cortex.

745 In Alzheimer's disease, which of the following neurotransmitters in cerebral cortex are decreased ?

Harrison's 18th Ed. 3306

- A. Acetylcholine
- B. Norepinephrine
- C. Serotonin
- D. All of the above

AD is associated with decreased levels of acetylcholine, its synthetic enzyme choline acetyltransferase and nicotinic cholinergic receptors in cerebral cortex due to degeneration of cholinergic neurons in nucleus basalis of Meynert. There is also reduction in norepinephrine levels in brainstem nuclei like locus coeruleus.

746 Which of the following statements is true about microscopic findings in Alzheimer's disease ?

Harrison's 18th Ed. 3306

- A. Neuritic plaques contain A β amyloid
- B. Silver staining neurofibrillary tangles in cytoplasm
- C. A β amyloid in arterial walls of cerebral blood vessels
- D. All of the above

In AD, microscopic examination of brain shows neuritic plaques containing A β amyloid, silver-staining neurofibrillary tangles (NFTs) in neuronal cytoplasm, and accumulation of A β amyloid in arterial walls of cerebral blood vessels.

747 Which of the following clinical features of Alzheimer's disease occurs in the later phases of the disease ?

N Engl J Med 2004;351:56-67

- A. Amnesic type of memory impairment
- B. Deterioration of language
- C. Visuospatial deficits
- D. Gait disturbances

748 In Alzheimer's disease, the neuritic plaque contains ?

Harrison's 18th Ed. 3306

- A. A β amyloid
- B. Apo ϵ 4
- C. α antichymotrypsin
- D. All of the above

Neuritic plaques contain a central core that includes A β amyloid, proteoglycans, Apo ϵ 4, α antichymotrypsin.

749 Which of the following statements is true about A β amyloid in Alzheimer's disease ?

Harrison's 18th Ed. 3306

- A. Neuritic plaques contains A β amyloid
- B. It is a protein of 39 - 42 amino acids
- C. Derived proteolytically from amyloid precursor protein
- D. All of the above

A β amyloid is a protein of 39-42 amino acids that is derived proteolytically from a larger transmembrane protein, amyloid precursor protein (APP).

750 A β peptide results from cleavage of amyloid precursor protein (APP) by ?

Harrison's 18th Ed. 3307 Figure 371-4

- A. β secretase
- B. δ secretase

- C. ϵ secretase
- D. All of the above

APP is a membrane-spanning protein that is processed A β amyloid which is deposited in neuritic plaques. A β peptide results from cleavage of APP by β - and γ -secretases.

751 Which of the following products of Amyloid precursor protein (APP) is neurotoxic ?

Harrison's 18th Ed. 3307 Figure 371-4

- A. A β_{42}
- B. A β_{40}
- C. P3
- D. All of the above

Amyloid precursor protein (APP) is catabolized by α , β , and γ secretases. Cleavage of APP by α and β secretases results in two products i.e. α secretase product and β secretase product. γ secretase acts on α secretase product to produce nontoxic P3 peptide. Similarly, γ secretase acts on β secretase product to produce nontoxic A β_{40} and toxic A β_{42} peptide. Excess production of A β_{42} is a key initiator of cellular damage in Alzheimer's disease.

752 In familial early-onset Alzheimer's disease, increased production of which peptide is most neurotoxic ?

Harrison's 18th Ed. 3307, N Engl J Med 2003;349:1056-63

- A. A β_{36}
- B. A β_{38}
- C. A β_{40}
- D. A β_{42}

Soluble amyloid fibrils (oligomers) lead to dysfunction of neural cells in AD. Misfolded A β_{42} molecules may be the most toxic form of this protein. Accumulation of oligomers eventually leads to formation of neuritic plaques.

753 In Alzheimer's disease, neuritic plaque is surrounded by ?

Harrison's 17th Ed. 2541

- A. Debris of degenerating neurons
- B. Microglia
- C. Macrophages
- D. All of the above

In AD, neuritic plaque core is surrounded by debris of degenerating neurons, microglia & macrophages.

754 In Alzheimer's disease, amyloid angiopathy may lead to ?

Harrison's 18th Ed. 3306

- A. Microhemorrhages
- B. Large lobar hemorrhages
- C. Ischemic infarctions
- D. All of the above

Accumulation of A β amyloid in cerebral arterioles, termed amyloid angiopathy, can lead to microhemorrhages, large lobar hemorrhages, or ischemic infarctions.

755 Neurofibrillary tangles (NFTs) in Alzheimer's disease is characterized by all except ?

Harrison's 18th Ed. 3306

- A. Found in neuronal cytoplasm
- B. Paired helical & twisted neurofilaments
- C. Represent abnormally phosphorylated tau protein
- D. Gold staining

NFTs are silver-staining, twisted neurofilaments in neuronal cytoplasm that represent abnormally phosphorylated tau protein and appear as paired helical filaments by electron microscopy.

756 Tau protein is characterized by all except ?
Harrison's 18th Ed. 3306

- A. It is a microtubule associated protein
- B. Functions to assemble and stabilize microtubules
- C. In Alzheimer's disease, it is hypophosphorylated
- D. Progressive supranuclear palsy may represent a tau pathologic process

Tau (τ) is a microtubule-associated protein that assembles & stabilizes microtubules that convey cell organelles, glycoproteins through neuron. A 'hyperphosphorylated' state of tau impairs its capacity to bind to microtubules.

757 Tau protein has pathological significance in which of the following disorders ?
Harrison's 18th Ed. 3306

- A. Alzheimer's disease
- B. Frontotemporal dementia
- C. Progressive supranuclear palsy
- D. All of the above

Tau plays a major role in the pathogenesis of FTD, PSP and Cortical Basal Degeneration (CBD).

758 APP gene implicated in the pathogenesis of Alzheimer's disease is present on which chromosome ?
Harrison's 18th Ed. 3307

- A. Chromosome 9
- B. Chromosome 11
- C. Chromosome 18
- D. Chromosome 21

APP gene implicated in the pathogenesis of Alzheimer's disease is present on chromosome 21.

759 Presenilin-1 (PS-1) gene implicated in the pathogenesis of Alzheimer's disease is present on which chromosome ?
Harrison's 18th Ed. 3307

- A. Chromosome 9
- B. Chromosome 11
- C. Chromosome 14
- D. Chromosome 21

Presenilin-1 (PS-1) gene implicated in the pathogenesis of Alzheimer's disease is present on chromosome 14 and encodes a protein called S182.

760 Presenilin-2 (PS-2) gene implicated in the pathogenesis of Alzheimer's disease is present on which chromosome ?
Harrison's 18th Ed. 3307

- A. Chromosome 1
- B. Chromosome 11
- C. Chromosome 14
- D. Chromosome 21

Presenilin-2 (PS-2) gene implicated in the pathogenesis of Alzheimer's disease is present on chromosome 1 and encodes a protein called STM2 (seven transmembrane domains).

761 Which of the following about S182 & STM2 is false ?
Harrison's 18th Ed. 3307

- A. Cytoplasmic neuronal proteins
- B. Widely expressed throughout nervous system
- C. Homologous to cell-trafficking protein - sel 12
- D. None of the above

S182 and STM2 are cytoplasmic neuronal proteins, widely expressed in the nervous system and are homologous to a cell-trafficking protein - sel 12.

762 Mutations in which of the following gene causes early-onset Familial Alzheimer's disease (FAD) ?
Harrison's 18th Ed. 3307

- A. APP
- B. Presenilin-1 (PS-1)
- C. Presenilin-2 (PS-2)
- D. Apo ϵ gene

Mutations in Presenilin-1 (PS-1) gene cause an early-onset AD (onset before age 60) transmitted in an autosomal dominant, highly penetrant fashion.

763 Apo ϵ gene implicated in the pathogenesis of Alzheimer's disease is present on which chromosome ?
Harrison's 18th Ed. 3307

- A. Chromosome 1
- B. Chromosome 11
- C. Chromosome 19
- D. Chromosome 21

Apo ϵ gene implicated in the pathogenesis of Alzheimer's disease is present on chromosome 19.

764 Gene implicated in pathogenesis of Alzheimer's disease is ?
Harrison's 18th Ed. 3307

- A. APP
- B. Presenilin-1 (PS-1) & Presenilin-2 (PS-2)
- C. Apo ϵ gene
- D. All of the above

AD genes include APP, Presenilin-1 (PS-1), Presenilin-2 (PS-2) and Apo ϵ gene.

765 Mutations in which gene is the most common cause of late-onset familial & sporadic forms of Alzheimer's disease ?
Harrison's 18th Ed. 3307

- A. APP
- B. Presenilin-1 (PS-1)
- C. Presenilin-2 (PS-2)
- D. Apo ϵ gene

Apo ϵ gene on chromosome 19 leads to late onset familial and sporadic forms of AD.

766 Age of onset of sporadic & familial forms of AD is modulated by which allelic variants of apolipoprotein ϵ ?
Harrison's 18th Ed. 3307, N Engl J Med 2001;344:1516

- A. ϵ 2
- B. ϵ 3
- C. ϵ 4
- D. All of the above

Apo ϵ 4 allele has a strong association with sporadic and late-onset familial cases of AD. Apo ϵ 4 remains the single most important biologic marker associated with risk for AD.

767 For Alzheimer's disease, which allelic variant of apolipoprotein ϵ is protective ?
Harrison's 18th Ed. 3307

- A. ϵ 2
- B. ϵ 3
- C. ϵ 4

- D. All of the above

There is evidence that the Apo $\epsilon 2$ allele maybe "protective" against Alzheimer's disease.

768 Carrying of which APO ϵ allele nearly doubles the lifetime risk of Alzheimer's disease ?

N Engl J Med 2003;349:1056-63

- A. APO $\epsilon 2$
B. APO $\epsilon 3$
C. APO $\epsilon 4$
D. None of the above

Apo $\epsilon 4$ allele is an important risk factor for AD.

769 Apo $\epsilon 4$ allele associated with which of the following diseases ?

Harrison's 18th Ed. 3308

- A. AD
B. FTD
C. DLB
D. CJD

Apo $\epsilon 4$ allele is not associated with FTD, DLB, or CJD.

770 Which of the following gene is implicated in AD pathogenesis ?

Harrison's 18th Ed. 3308

- A. Clusterin (CLU)
B. Phosphatidylinositol-binding clathrin assembly protein (PICALM)
C. Complement component (3b/4b) receptor 1 (CR1)
D. All of the above

Recent genome-wide association studies have implicated the clusterin (CLU), phosphatidylinositol-binding clathrin assembly protein (PICALM), and complement component (3b/4b) receptor 1 (CR1) genes in AD pathogenesis. CLU may play a role in synapse turnover, PICALM participates in clathrin-mediated endocytosis & CR1 may be involved in amyloid clearance through complement pathway.

771 Adults with which of the following consistently develop typical neuropathologic hallmarks of AD ?

Harrison's 18th Ed. 3307

- A. Klienfelter syndrome
B. Turner syndrome
C. Down's syndrome
D. All of the above

Adults with trisomy 21 (Down's syndrome) consistently develop the typical neuropathologic hallmarks of AD if they survive beyond age 40.

772 Which of the undermentioned drug for Alzheimer's disease is a cholinesterase inhibitor ?

Harrison's 18th Ed. 3308

- A. Tacrine
B. Donepezil
C. Rivastigmine
D. All of the above

Pharmacologic action of donepezil, rivastigmine, and galantamine is inhibition of cholinesterase.

773 Which of the undermentioned drug for Alzheimer's disease is a cholinesterase inhibitor ?

Harrison's 18th Ed. 3308

- A. Galantamine
B. Donepezil

- C. Rivastigmine
D. All of the above

Tacrine (tetrahydroaminoacridine), donepezil, rivastigmine, and galantamine act by inhibition of cholinesterase leading to increase cerebral Ach levels.

774 Which of the following acts on N-methyl-D-aspartate (NMDA) channels ?

Harrison's 18th Ed. 3308

- A. Donepezil
B. Rivastigmine
C. Memantine
D. Galantamine

Memantine acts by blocking overexcited N-methyl-D-aspartate (NMDA) channels. It is used along with cholinesterase inhibitors and is not approved for mild AD.

775 Which of the following drugs is contraindicated in patients with Parkinson's disease ?

N Engl J Med 2003;349:1056-63

- A. Galantamine
B. Donepezil
C. Rivastigmine
D. Haloperidol

776 Which of the following drugs is associated with an increased risk of stroke ?

N Engl J Med 2003;349:1056-63

- A. Galantamine
B. Donepezil
C. Rivastigmine
D. Risperidone

777 Which of the following drug has been discarded due to hepatotoxicity ?

Harrison's 18th Ed. 3308

- A. Donepezil
B. Rivastigmine
C. Tacrine
D. Galantamine

778 Tarenflurbil and Semagacestat are ?

Harrison's 18th Ed. 3308

- A. Estrogen analogues
B. Vaccines
C. Gamma secretase inhibitors
D. HMG-CoA reductase inhibitors

Tarenflurbil and Semagacestat are gamma secretase inhibitors. Their use is being explored in AD treatment with a hypothesis that they would diminish the production of $A\beta_{42}$.

779 EEG studies are most useful for the diagnosis of ?

N Engl J Med 2001;344:1516, Harrison's 17th Ed. 2542

- A. Alzheimer's disease
B. Frontotemporal dementia
C. Parkinson's disease
D. Creutzfeldt - Jakob disease

Abnormal periodic EEG discharges & cortical / basal ganglia abnormalities on diffusion-weighted MRI are unique diagnostic features of CJD.

780 **“Leukoaraiosis” refers to ?**
Harrison’s 18th Ed. 3309

A. White skin tags
B. White lines around umbilicus
C. Diffuse white matter disease
D. White nails

Leukoaraiosis or subcortical arteriosclerotic leukoencephalopathy or Binswanger’s disease is a diffuse white matter disease which presents with dementia with lacunar infarctions found on MRI. Term Binswanger’s disease should be used with caution, because it does not clearly identify a single entity.

781 **Cerebral vascular disease is a common cause of dementia in ?**
Harrison’s 18th Ed. 3309

A. Asia
B. Britain
C. Spain
D. North America

Cerebral vascular disease is a more common cause of dementia in Asia than in Europe & North America.

782 **Which of the following white matter diseases also present with dementia ?**
Harrison’s 18th Ed. 3309

A. Adult metachromatic leukodystrophy
B. Progressive multifocal leukoencephalopathy
C. CADASIL
D. All of the above

White matter diseases that also present with dementia include adult metachromatic leukodystrophy (arylsulfatase A deficiency), progressive multifocal leukoencephalopathy (JC virus infection) & cerebral autosomal dominant arteriopathy with subcortical infarcts & leukoencephalopathy (CADASIL).

783 **Which of the following statements about Frontotemporal dementia (FTD) is false ?**
Harrison’s 18th Ed. 3310

A. Begins in fifth to seventh decade
B. More common in men than women
C. Behavioral symptoms predominate in early stages
D. None of the above

FTD begins in V to VII decades. It is more common in men than women. Unlike AD, behavioral symptoms predominate in early stages of FTD.

784 **In FTD, mutations occur in which of the following genes ?**
Harrison’s 18th Ed. 3310

A. Valosin
B. MAPT
C. GRN
D. All of the above

The most common autosomal dominantly inherited mutations causing FTD involve the MAPT (causing loss of function in tau molecule) or GRN genes (altering progranulin protein gene), both on chromosome 17 and both associated with parkinsonian features. Mutations in valosin-containing protein (chromosome 9) and charged multivesicular body protein 2b (CHMP2b) genes (chromosome 3) also lead to rare autosomal dominant forms of familial FTD.

785 **TDP-43 stands for ?**
Harrison’s 18th Ed. 3301

A. TAR DNA binding protein 43
B. TAR depleted protein 43
C. TAR dense protein 43

D. TAR divided protein 43

TDP-43 stands for TAR DNA binding protein 43.

786 **Which of the following statements about frontotemporal dementia is false ?**
Harrison’s 18th Ed. 3310

A. Memory and visuospatial skills relatively spared
B. Cholinergic system is relatively spared
C. Marked atrophy of temporal and/or frontal lobes
D. None of the above

In FTD, memory & visuospatial skills are relatively spared. Distinguishing anatomic hallmark of FTD is a focal atrophy of frontal, insular, and/or temporal cortex. Cholinergic system is spared in FTD.

787 **Primary progressive aphasia is related to ?**
Harrison’s 18th Ed. 3310

A. FTD
B. PSP
C. CBD
D. Motor neuron disease

The left-hemisphere presentation of FTD is called primary progressive aphasia with nonfluent and semantic variants.

788 **Which of the following best relates to Pick bodies ?**
Harrison’s 18th Ed. 3311

A. Astrocytic plaque
B. Intraneuronal cytoplasmic inclusions
C. Ballooned neurons
D. All of the above

Pick’s disease is characterized by selective involvement of anterior frontal & temporal neocortex and pathologically by intraneuronal cytoplasmic inclusions (Pick bodies) which are argyrophilic, staining positively with the Bielschowsky silver method and also with immunostaining for tau.

789 **Progressive supranuclear palsy (PSP) involves which of the following ?**
Harrison’s 18th Ed. 3311

A. Brainstem
B. Basal ganglia
C. Limbic structures
D. All of the above

Progressive supranuclear palsy (PSP) is a degenerative disease that involves the brainstem, basal ganglia, limbic structures, and selected areas of cortex.

790 **PSP begins with which of the following ?**
Harrison’s 18th Ed. 3311

A. Frequent falls
B. Symmetrical axial rigidity
C. Dementia
D. Seizure

PSP begins with falls and vertical supranuclear gaze paresis or nonfluent aphasia and progresses to symmetrical rigidity and dementia. Frequent unexplained and sometimes spectacular falls are common secondary to a combination of axial rigidity, inability to look down, and bad judgment.

791 **Globose tangles best relate to ?**
Harrison’s 18th Ed. 3311

A. HD
B. FTD

- C. CBD
- D. AD

In FTD, there occurs accumulation of hyperphosphorylated tau within neurons and glia called globose tangles.

792 “Alien hand” phenomenon is a feature of ?

Harrison’s 18th Ed. 3312

- A. PSP
- B. DLB
- C. CBD
- D. AD

In cortical basal degeneration (CBD), apraxia of one arm and hand is called the alien hand.

793 Glial plaques with tau inclusions are pathognomonic of ?

Harrison’s 17th Ed. 2545

- A. PSP
- B. DLB
- C. CBD
- D. AD

Glial plaques with tau inclusions are pathognomonic of CBD.

794 Which of the following is rarely familial ?

Harrison’s 18th Ed. 3312

- A. HD
- B. FTD
- C. CBD
- D. AD

CBD is rarely familial.

795 Which of the following is a characteristic feature of Dementia with Lewy Bodies (DLB) ?

Harrison’s 18th Ed. 3312

- A. Seizure
- B. Symmetrical axial rigidity
- C. Visual hallucinations
- D. Auditory hallucinations

DLB is characterized by visual hallucinations, parkinsonism, fluctuating alertness, falls and REM sleep behavior disorder.

796 In DLB, Lewy bodies are found in ?

Harrison’s 18th Ed. 3312

- A. Cerebral cortex
- B. Amygdala
- C. Substantia nigra
- D. All of the above

Key neuropathologic feature of DLB is the presence of Lewy bodies throughout the cortex, amygdala, cingulate cortex, and substantia nigra.

797 Which of the following about Lewy bodies is false ?

Harrison’s 18th Ed. 3312

- A. Intraneuronal cytoplasmic inclusions
- B. Stain with periodic acid–Schiff (PAS) & ubiquitin
- C. Composed of straight neurofilaments 7 to 20 nm long
- D. None of the above

Lewy bodies are intraneuronal cytoplasmic inclusions that stain with periodic acid-Schiff (PAS) & ubiquitin. They are composed of straight neurofilaments 7 - 20 nm long with surrounding amorphous material.

798 George Huntington belonged to which country ?

- A. Great Britain
- B. America
- C. Australia
- D. Canada

Huntington’s disease (HD) was described by George Huntington, an American physician in 1872. Huntington’s gene is single, causal gene and an accurate genetic test for HD is available.

799 Huntington’s disease (HD) is caused by mutations in the Huntington’s gene on the ?

Harrison’s 18th Ed. 3312

- A. Short arm of chromosome 4
- B. Long arm of chromosome 4
- C. Short arm of chromosome 5
- D. Long arm of chromosome 5

HD is caused by mutations in the Huntington’s gene on the short arm of chromosome 4.

800 “Huntingtin” is a ?

Harrison’s 16th Ed. 2415

- A. Cell membrane protein
- B. Cytoplasmic protein
- C. Nuclear protein
- D. Nuclear membrane protein

Huntingtin gene (HTT) encodes the highly conserved cytoplasmic protein huntingtin which is present in all neurons.

801 Chorea is a characteristic feature of which of the following ?

Harrison’s 18th Ed. 3312

- A. Dementia with Lewy Bodies (DLB)
- B. Huntington’s disease (HD)
- C. Cortical basal degeneration (CBD)
- D. Creutzfeldt-Jakob disease (CJD)

HD is an autosomal dominant, degenerative brain disorder characterized by chorea, behavioral disturbance & frontal executive disorder in IV or V decade. Memory is frequently not impaired.

802 In Huntington’s disease (HD), which of the following is predominantly atrophied ?

Harrison’s 18th Ed. 3312

- A. Striatum
- B. Cerebellum
- C. Hippocampus
- D. Mamillary bodies

Neuropathology of HD consists of widespread cerebral atrophy with prominent involvement of striatum and cerebral cortex.

803 Which of the following is not a feature of normal-pressure hydrocephalus (NPH) ?

Harrison’s 18th Ed. 3312

- A. Abnormal gait
- B. Dementia
- C. Chorea
- D. Urinary incontinence

Clinical triad of normal-pressure hydrocephalus (NPH) includes abnormal gait (ataxic or apractic), mild to moderate dementia and urinary incontinence.

804 Cortical atrophy is not a feature of ?

Harrison's 18th Ed. 3312

- A. AD
- B. FTD
- C. NPH
- D. CJD

In NPH, neuroimaging shows enlarged lateral ventricles (hydrocephalus) with little or no cortical atrophy with a patent aqueduct of Sylvius suggesting communicating hydrocephalus.

805 Which of the following is not a MRI feature of Normal-pressure hydrocephalus ?

Harrison's 18th Ed. 3313 Figure 371-10

- A. Stretching of corpus callosum
- B. Elevation of the floor of third ventricle
- C. Enlargement of the aqueduct
- D. Dilation of the lateral ventricle

MRI feature of normal-pressure hydrocephalus (NPH) include dilation of lateral ventricle, stretching of corpus callosum, depression of the floor of third ventricle, enlargement of the patent aqueduct (communicating hydrocephalus).

806 Which of the following is a feature of gait abnormality in NPH ?

Harrison's 18th Ed. 3313

- A. External hip rotation
- B. Low foot clearance
- C. Short strides
- D. All of the above

Characteristic "magnetic" gait with external hip rotation, low foot clearance and short strides, along with prominent truncal sway or instability, favors NPH.

807 Dementia & seizures in Marchiafava-Bignami disease is related to ?

Harrison's 18th Ed. 3313

- A. Male
- B. Italian
- C. Drinkers of red wine
- D. All of the above

808 Which of the following degenerates in Marchiafava-Bignami disease ?

Harrison's 18th Ed. 3313

- A. Caudate nucleus
- B. Thalamus
- C. Corpus callosum
- D. Substantia nigra

Marchiafava-Bignami disease consists of dementia and seizures with degeneration of corpus callosum in male Italian drinkers of red wine.

809 Which of the following is not related to Wernicke's encephalopathy ?

Harrison's 18th Ed. 3313

- A. Confusion
- B. Seizure
- C. Ataxia

D. Diplopia

Clinical presentation of Wernicke's encephalopathy include confusion, ataxia, & diplopia due to ophthalmoplegia.

810 Thiamine deficiency damages which of the following ?

Harrison's 18th Ed. 3313

- A. Thalamus
- B. Mammillary bodies
- C. Midline cerebellum
- D. All of the above

Thiamine (vitamin B₁) deficiency damages thalamus, mammillary bodies, midline cerebellum, periaqueductal grey matter of midbrain, peripheral nerves and trochlear & abducens nuclei.

811 In Thiamine deficiency, damage to which of the following correlates most closely with memory loss ?

Harrison's 18th Ed. 3313

- A. Dorsomedial thalamus
- B. Mammillary bodies
- C. Midline cerebellum
- D. Periaqueductal grey matter of midbrain

In thiamine deficiency, damage to dorsomedial thalamus correlates most closely with memory loss.

812 Which of the following is related to Korsakoff's psychosis ?

Harrison's 18th Ed. 3313

- A. Prolonged untreated thiamine deficiency
- B. Irreversible dementia
- C. Amnesic syndrome
- D. All of the above

Prolonged untreated thiamine deficiency results in irreversible dementia / amnesic syndrome (Korsakoff's psychosis) or even death.

813 In Vitamin B₁₂ deficiency, damage occurs to ?

Harrison's 18th Ed. 3313

- A. Posterior columns
- B. Corticospinal tracts
- C. Peripheral nerves
- D. All of the above

In Vitamin B₁₂ deficiency, damage occur to posterior columns, corticospinal tracts, peripheral nerves and cerebral myelinated fibers (dementia).

814 In Vitamin B₁₂ deficiency, neurologic damage is related to ?

Harrison's 18th Ed. 3313

- A. Inhibition of δ-aminolevulinic acid dehydrase
- B. Deficiency of S-adenosyl methionine
- C. Elevated plasma levels of Aβ amyloid
- D. All of the above

Mechanism of neurologic damage in Vitamin B₁₂ deficiency is related to deficiency of S-adenosyl methionine which is required for methylation of myelin phospholipids.

815 Limbic encephalitis best relates to ?

Harrison's 18th Ed. 3314

- A. Primary neoplasms of CNS
- B. Metastatic neoplasms of CNS
- C. Paraneoplastic syndrome
- D. Isolated vasculitis of CNS

A paraneoplastic syndrome of dementia associated with occult carcinoma (small cell lung cancer) is termed limbic encephalitis in which confusion, agitation, seizures, poor memory, emotional changes, and frank dementia may occur.

816 Which of the following chronic metal exposure can lead to choreoathetosis ?

Harrison's 18th Ed. 3314

- A. Chronic mercury poisoning
- B. Aluminum poisoning
- C. Chronic arsenic intoxication
- D. Chronic lead poisoning

Chronic mercury poisoning produces dementia, peripheral neuropathy, ataxia, and tremulousness that may progress to choreoathetosis.

817 Mees' lines are best related to ?

Harrison's 18th Ed. 3314

- A. Chronic mercury poisoning
- B. Aluminum poisoning
- C. Chronic arsenic intoxication
- D. Chronic lead poisoning

Mees' lines are transverse white lines of the fingernails seen in chronic arsenic intoxication.

818 Which of the following chronic metal exposure can lead to myoclonic jerks ?

Harrison's 18th Ed. 3314

- A. Chronic mercury poisoning
- B. Aluminum poisoning
- C. Chronic arsenic intoxication
- D. Chronic lead poisoning

Dialysis dementia syndrome due to aluminum overexposure is associated with confusion, aphasia, memory loss, agitation, and, later, lethargy and stupor. Speech arrest and myoclonic jerks are common and associated with severe and generalized EEG changes.

819 "Dementia pugilistica" is related to which of the following ?

Harrison's 18th Ed. 3314

- A. Nonconvulsive seizure disorder
- B. Transient global amnesia (TGA)
- C. Chronic metal exposure
- D. Recurrent head trauma in professional boxers

Recurrent head trauma in professional boxers may lead to dementia, called the "punch drunk" syndrome or dementia pugilistica.

820 In Transient global amnesia (TGA), which of the following memory types is lost ?

Harrison's 18th Ed. 3315

- A. Working
- B. Episodic
- C. Remote
- D. All of the above

Transient global amnesia is characterized by sudden onset of a severe episodic memory deficit in the setting of an emotional stimulus or physical exertion, in persons over age 50 years.

821 Along with dementia, myoclonus is a feature of which of the following disease ?

Harrison's 17th Ed. 2538, 2548

- A. Neuronal ceroid lipofuscinoses
- B. Creutzfeldt - Jakob disease

- C. Corticobasal degeneration (CBD)
- D. All of the above

372 - Parkinson's Disease (PD) and Other Movement Disorders

822 Paralysis agitans was described in Ayurveda (Charaka Samhita) centuries ago by the name of ?

N Engl J Med 1998;339:1049

- A. Adhyashana
- B. Kampavata
- C. Jatharagni
- D. Shalmali

Paralysis agitans described by James Parkinson is an independent description of Kampavata (Kampa:tremor, Vata:metabolic derangement predisposing to neurologic and mental diseases) described in Ayurveda (Charaka Samhita) centuries ago. Several preparations containing Mucuna pruriens (Kapikachu) were described for treatment of patients with Kampavata. The major active compound present in Mucuna pruriens is levodopa.

823 The first name of Parkinson was ?

- A. John
- B. James
- C. Jack
- D. George

Parkinson disease was first described by James Parkinson in 1817.

824 Corpus Luysii is the name given to ?

Principles of Neurology, Adams RD, 5th Ed. 57

- A. Claustrum
- B. Subthalamic nucleus
- C. Globus pallidus
- D. Substantia nigra

Corpus Luysii is the name given to subthalamic nucleus (STN) which is the only glutamatergic nucleus in the "basal ganglia".

825 Which of the following is commonest neurodegenerative disease ?

Harrison's 18th Ed. 3317

- A. Alzheimer's disease (AD)
- B. Parkinson's disease (PD)
- C. Wilson's disease (WD)
- D. SCA 3 (spinocerebellar ataxia)

Parkinson's disease (PD) is the second commonest neurodegenerative disease, exceeded only by Alzheimer's disease (AD).

826 Which of the following is not included in the cardinal features of PD ?

Harrison's 18th Ed. 3317 Table 372-1

- A. Rest tremor
- B. Masked facies
- C. Bradykinesia
- D. Gait impairment

Cardinal features of PD include rest tremor, rigidity, bradykinesia and gait impairment. Nondopaminergic features (as they do not fully respond to dopaminergic therapy) include freezing of gait, postural instability, speech difficulty, autonomic disturbances, sensory alterations, mood disorders, sleep dysfunction, cognitive impairment, and dementia.

827 Non-motor features of PD include all except ?*Harrison's 18th Ed. 3317, Table 372-1*

- A. Sleep disturbances
- B. Cognitive impairment
- C. Loss of taste
- D. Loss of smell

Non-motor aspects of PD include depression and anxiety, cognitive impairment, sleep disturbances, sensory abnormalities and pain, loss of smell (anosmia) and disturbances of autonomic function.

828 Pathological hallmark feature of PD is ?*Harrison's 18th Ed. 3317*

- A. Degeneration of dopaminergic neurons in SNc
- B. Reduced striatal dopamine
- C. Intracytoplasmic proteinaceous inclusions (Lewy bodies)
- D. All of the above

Pathologically, the hallmark features of PD are degeneration of dopaminergic neurons in the substantia nigra pars compacta (SNc), reduced striatal dopamine, and intracytoplasmic proteinaceous inclusions known as Lewy bodies.

829 Cholinergic neurons are present in ?*Harrison's 18th Ed. 3317*

- A. Locus coeruleus (LC)
- B. Nucleus basalis of Meynert (NBM)
- C. Raphe nuclei of the brainstem
- D. All of the above

Cholinergic neurons are present in nucleus basalis of Meynert (NBM). Norepinephrine neurons are present in locus coeruleus (LC) and serotonin neurons in raphe nuclei of the brainstem, and neurons of the olfactory system, cerebral hemispheres, spinal cord, and peripheral autonomic nervous system.

830 Pathological changes in PD begin in ?*Harrison's 18th Ed. 3317*

- A. Peripheral autonomic nervous system
- B. Olfactory system
- C. Dorsal motor nucleus of vagus nerve in lower brainstem
- D. All of the above

In PD, pathology begins in peripheral autonomic nervous system, olfactory system & dorsal motor nucleus of vagus nerve in lower brainstem, and then spreads in a sequential manner to affect the upper brainstem and cerebral hemispheres. Thus, dopamine neurons are affected in midstage disease.

831 Which of the following is mostly responsible for signs of parkinsonism ?*Harrison's 17th Ed. 2557, Figure 366-5*

- A. Decreased traffic in indirect striato-pallidal pathway
- B. Increased traffic in direct striato-nigral pathway
- C. Decreased ability of thalamus to activate frontal cortex
- D. All of the above

Striatal dopamine denervation results in increased traffic in indirect striato-pallidal pathway and decreased traffic in direct pathway. Downstream consequence of this is increased activity in striatal outflow stemming from the increased activity of STN and ultimately GPi/SNr neurons. Because striatal outflow is inhibitory to the thalamus (GABA), there is a decrease in the ability of thalamus to activate frontal cortex leading to signs of parkinsonism.

832 Which of the following is not a component of basal ganglia ?*Harrison's 18th Ed. 3317*

- A. Striatum (putamen & caudate nucleus)
- B. Subthalamic nucleus (STN)

C. Globus pallidus pars externa (GPe)

D. Claustrum

Basal ganglia are subcortical nuclei that include striatum (putamen & caudate nucleus), subthalamic nucleus (STN), globus pallidus pars externa (GPe), globus pallidus pars interna (GPi) & SNc. Symptom complex of Parkinsonism reflect damage to different components of basal ganglia.

833 Which of the following is the revised criteria for the clinical diagnosis of PD ?*Harrison's 18th Ed. 3317*

- A. U.K. brain bank criteria
- B. U.K. brain store criteria
- C. U.K. brain support criteria
- D. U.K. brain diagnosis criteria

U.K. brain bank criteria is the revised criteria for the clinical diagnosis of PD.

834 In PD, metabolic imaging (PET/SPECT) shows which of the following ?*Harrison's 18th Ed. 3317*

- A. Reduced uptake in posterior putamen
- B. Increased activity in GPi
- C. Decreased activity in thalamus
- D. All of the above

Imaging of brain dopamine system in PD with positron emission tomography (PET) or single-photon emission computed tomography (SPECT) shows reduced uptake of striatal dopaminergic markers, particularly in posterior putamen, increased activity in the GPi with decreased activity in thalamus.

835 Commonest cause of familial PD is due to mutations of ?*Harrison's 18th Ed. 3318*

- A. LRRK1 gene
- B. LRRK2 gene
- C. LRRK3 gene
- D. LRRK4 gene

Mutations of LRRK2 gene are the commonest cause of familial PD and are responsible for ~1% of typical sporadic cases of the disease.

836 As a cause of PD, which LRRK2 mutation is the commonest ?*Harrison's 18th Ed. 3321*

- A. Gly2017Ser
- B. Gly2018Ser
- C. Gly2019Ser
- D. Gly2020Ser

Six different LRRK2 mutations have been linked to PD, with Gly2019Ser being the commonest.

837 Diagnosis of atypical Parkinsonism is favoured by all except ?*Harrison's 18th Ed. 3318*

- A. Early speech impairment
- B. Early gait impairment
- C. Absence of rest tremor
- D. Asymmetry

Atypical Parkinsonism is characterized by early speech and gait impairment, absence of rest tremor, no asymmetry, poor or no response to levodopa, and an aggressive clinical course. Pathologically, neurodegeneration occurs without Lewy bodies. Metabolic imaging of basal ganglia/thalamus network shows decreased activity in GPi with increased activity in thalamus, reverse of what is seen in PD.

838 Manifestations of Multiple-system atrophy (MSA) include all except ?*Harrison's 18th Ed. 3318*

- A. Parkinsonian features
- B. Cerebellar features
- C. Sensory features
- D. Autonomic features

Multiple-system atrophy (MSA) manifests as a combination of parkinsonian, cerebellar, and autonomic features. When parkinsonian features are predominant, term MSA-p is used and when cerebellar features are predominant, term MSA-c is used.

839 Degeneration of which of the following is found in MSA ?*Harrison's 18th Ed. 3319*

- A. SNc
- B. Striatum
- C. Inferior olivary nuclei
- D. All of the above

840 Glial cytoplasmic inclusions (GCIs) characteristic of MSA stain for ?*Harrison's 18th Ed. 3319*

- A. Tau
- B. Alpha-synuclein
- C. UCHL-1
- D. Parkin

Pathologically, MSA is characterized by degeneration of SNc, striatum, cerebellum & inferior olivary nuclei coupled with characteristic glial cytoplasmic inclusions (GCIs) that stain for alpha-synuclein.

841 "Hot cross buns" sign relates to which of the following ?*Harrison's 18th Ed. 3319*

- A. MSA
- B. PSP
- C. Corticobasal ganglionic degeneration
- D. All of the above

The pontine "hot cross buns" sign is a MRI feature of MSA-c.

842 "Hummingbird sign" relates to which of the following ?*Harrison's 18th Ed. 3319*

- A. MSA
- B. PSP
- C. Corticobasal ganglionic degeneration
- D. All of the above

The "hummingbird sign" on midsagittal MRI images is a feature of progressive supranuclear palsy (PSP) and is due to atrophy of midbrain with relative preservation of pons.

843 Parkinsonism is a feature of ?*Harrison's 18th Ed. 3320*

- A. Wilson's disease
- B. Huntington's disease
- C. Hallervorden-Spatz disease
- D. All of the above

Parkinsonism is a feature of Wilson's disease, Huntington's disease (Westphal variant), dopa-responsive dystonia and pantothenate kinase (PANK)-associated neurodegeneration (formerly known as Hallervorden-Spatz disease).

844 Which of the following is the cause of PD in majority ?*Harrison's 18th Ed. 3320*

- A. Sporadic
- B. Genetic
- C. Cerebrovascular disease
- D. Drugs

Most PD cases occur sporadically (85–90%) and are of unknown cause.

845 Peak age of onset of Sporadic Parkinson's disease (PD) is in which decade of life ?*Harrison's 17th Ed. 2549*

- A. 50s
- B. 60s
- C. 70s
- D. 80s

Peak age of onset of PD is in the 60s (range is 35 to 85 years), and the course of the illness ranges between 10 and 25 years.

846 Factors linked to a reduced incidence of PD include all except ?*Harrison's 18th Ed. 3320, Harrison's 17th Ed. 2550*

- A. Coffee drinking
- B. Smoking
- C. Use of NSAIDs
- D. Alcohol use

Factors linked to a reduced incidence of PD include coffee drinking, smoking, use of nonsteroidal anti-inflammatory drugs, and estrogen replacement in postmenopausal women.

847 Environmental risk factors for PD include all except ?*Harrison's 18th Ed. 3320*

- A. Exposure to pesticides
- B. Consumption of well water
- C. Rural living
- D. Urban living

Risk factors include a positive family history, male gender, head injury, exposure to pesticides, consumption of well water, and rural living.

848 Which of the following neurotoxin produces parkinsonism ?*Harrison's 18th Ed. 3320*

- A. Apamin
- B. Botulinum
- C. MPTP
- D. Tetanospasmin

MPTP (1-methyl-4-phenyl-1,2,5,6-tetrahydropyridine) is a byproduct of the illicit manufacture of a heroin-like drug, causes a PD-like syndrome in addicts. MPTP is transported to CNS, where it is metabolized to form MPP⁺, a mitochondrial toxin that is selectively taken up by, and damages, dopamine neurons. MPTP toxicity can be prevented by coadministration of a MAO-B inhibitor that blocks its conversion to the toxic pyridinium ion MPP⁺.

849 Toxins that can produce secondary Parkinsonism include all except ?*Harrison's 18th Ed. 3318, Table 372-2*

- A. 1-Methyl-1,2,4,6 tetrahydropyridine (MPTP)
- B. Manganese
- C. Cyanide
- D. Carbon dioxide

850 Toxins that can produce secondary PD include all except ?

Harrison's 18th Ed. 3318, Table 372-2

- A. Methanol
- B. Ethanol
- C. Carbon monoxide
- D. Carbon disulfide

1-Methyl-1,2,4,6 tetrahydropyridine (MPTP), Manganese, Cyanide, Methanol, Carbon monoxide, Carbon disulfide, Hexane produce parkinsonism.

851 Drug that can cause secondary parkinsonism is ?

Harrison's 18th Ed. 3319-3320

- A. Amiodarone
- B. Lithium
- C. Chlorperazine
- D. All of the above

Drugs that can cause secondary parkinsonism include metoclopramide, chlorperazine, tetrabenazine, amiodarone, and lithium.

852 Drugs that can produce secondary PD include all except ?

Harrison's 17th Ed. 2553, Table 366-2

- A. Metoclopramide
- B. Reserpine
- C. Methylidopa
- D. Clonidine

853 Drugs that can produce secondary PD include all except ?

Harrison's 17th Ed. 2553, Table 366-2

- A. Lithium carbonate
- B. Valproic acid
- C. Phenytoin
- D. Fluoxetine

Drugs that can produce secondary PD include neuroleptics (typical antipsychotics), some atypical antipsychotics, antiemetics (compazine, metoclopramide), dopamine-depleting agents (reserpine, tetrabenazine), alpha methylidopa, lithium carbonate, valproic acid, fluoxetine.

854 Which of the following gene is a late-onset PD susceptibility gene ?

Harrison's 17th Ed. 2553

- A. PARK 1
- B. PARK 2
- C. PARK 7
- D. PARK 10

PARK10 is a late-onset PD susceptibility gene.

855 Which of the following gene leads to an autosomal dominant form of PD ?

Harrison's 18th Ed. 3320 Table 372-4

- A. PARK 1
- B. PARK 4
- C. PARK 5
- D. All of the above

PARK1, PARK4 & PARK5 genes lead to an autosomal dominant form of PD with atypical features like early age of onset & rapid progression of symptoms.

856 Which of the following gene leads to an autosomal recessive form of PD ?

Harrison's 18th Ed. 3320 Table 372-4

- A. PARK 1
- B. PARK 2
- C. PARK 5
- D. All of the above

PARK2 and PARK7 genes lead to autosomal recessive disorders with atypical features like juvenile forms of parkinsonism.

857 Which of the following statements about familial forms of PD is false ?

Harrison's 18th Ed. 3320 Table 372-4

- A. PARK1 and PARK5 lead to autosomal dominant PD
- B. PARK2 and PARK7 lead to autosomal recessive PD
- C. PARK5 encodes α -synuclein
- D. PARK2 encodes parkin

PARK1 encodes alpha-synuclein, mutation leading to its abnormal aggregation. PARK2 encodes parkin, an E3 ubiquitin protein ligase.

858 Which of the following is false for Familial Parkinson's disease ?

Harrison's 17th Ed. 2552

- A. Mutations in α -synuclein and ubiquitin carboxy-terminal hydroxylase L1 (UCH-L1)
- B. Characteristic histopathologic feature is Lewy body
- C. Lewy body is eosinophilic cytoplasmic inclusion that contains neurofilaments and α -synuclein
- D. None of the above

859 Glutamate is the neurotransmitter for which of the following pathways ?

Harrison's 18th Ed. 3322, Figure 372-5

- A. Globus pallidus externa - subthalamic nucleus
- B. Substantia nigra compacta - striatum
- C. Subthalamic nucleus - Substantia nigra reticulata
- D. Globus pallidus interna - thalamus

860 Gamma aminobutyric acid (GABA) is the neurotransmitter for which of the following pathways ?

Harrison's 18th Ed. 3322, Figure 372-5

- A. Globus pallidus externa - subthalamic nucleus
- B. Striatum - Globus pallidus interna
- C. Globus pallidus interna - thalamus
- D. All of the above

861 Which of the following pathways is excitatory ?

Harrison's 18th Ed. 3322, Figure 372-5

- A. Globus pallidus externa - subthalamic nucleus
- B. Striatum - Globus pallidus externa
- C. Globus pallidus interna - thalamus
- D. Subthalamic nucleus - Globus pallidus interna

862 Which of the following pathways is inhibitory ?

Harrison's 18th Ed. 3322, Figure 372-5

- A. Globus pallidus externa - subthalamic nucleus
- B. Striatum - Globus pallidus externa
- C. Globus pallidus interna - thalamus
- D. All of the above

863 Which of the following is false in PD ?*Harrison's 18th Ed. 3321*

- A. Increased firing of neurons in STN
- B. Increased firing of neurons in GPi
- C. Excessive inhibition of thalamus
- D. None of the above

In PD, dopamine denervation causes increased firing of neurons in STN & GPi, resulting in excessive inhibition of thalamus, consequent reduced activation of cortical motor systems & development of parkinsonian features.

864 Which of the following is most frequently present in patients with true PD ?*Harrison's 17th Ed. 2550*

- A. Rest tremor
- B. Rigidity
- C. Bradykinesia
- D. Masked facies

Three cardinal signs of PD are rest tremor, rigidity & bradykinesia. Tremor is present in 85% of patients with true PD and diagnosis of PD is difficult if tremor is absent.

865 Most disabling motor feature of PD is ?*Harrison's 17th Ed. 2550*

- A. Rest tremor
- B. Rigidity
- C. Bradykinesia
- D. Stooped posture

The most disabling motor feature of PD is bradykinesia.

866 Which of the following is false about 'rest tremor' in PD ?*Harrison's 17th Ed. 2550*

- A. Frequency of 4 to 6 Hz
- B. Appear bilaterally, first distally
- C. May appear in lips, tongue and jaw
- D. Sparing head and neck

Rest tremor, at a frequency of 4 to 6 Hz, typically appears unilaterally, first distally, involving the digits and wrist with a "pill-rolling" character. Tremor usually spreads proximally, ipsilaterally, and occasionally to the leg before crossing to the other side. It may appear later in lips, tongue and jaw but spares the head and neck.

867 Testing for postural instability in PD is done by ?*Harrison's 17th Ed. 2550, Figure 366-1*

- A. Swing test
- B. Push test
- C. Pull test
- D. Lift test

In advanced PD, postural instability is one of the most disabling feature. It can be tested in office with the "pull test".

868 Term used to describe gait in PD is ?*Harrison's 17th Ed. 2550*

- A. Pigeon gait
- B. Antalgic gait
- C. Scissor gait
- D. Festinating gait

Festinating gait is a classic sign of parkinsonism due to a combination of flexed posture and loss of postural reflexes. The patient accelerates to "catch up" with body's center of gravity.

869 In Latin "festino" means ?

- A. "to fall"
- B. "to freeze"
- C. "to hurry"
- D. "to swing"

In Latin "festino" means "to hurry".

870 Which of the following strongly suggests a diagnosis other than PD ?*Harrison's 17th Ed. 2550*

- A. Dystonia involving distal arm or leg
- B. Significant postural instability & falls in first years of illness
- C. Proximal and ipsilateral tremors
- D. Freezing of gait

Significant postural instability and falls in the first years of the illness strongly suggest a diagnosis other than PD like Progressive Supranuclear Palsy, DLB.

871 Manifestation that may be present long before the onset of motor signs in PD include ?*Harrison's 17th Ed. 2550*

- A. Anosmia
- B. Depression
- C. Sleep disorders
- D. All of the above

Anosmia, depression and sleep disorders may be present long before the onset of motor signs.

872 Which of the following symptom precedes onset of PD ?*Harrison's 17th Ed. 2551*

- A. Rapid eye movement - behavioral disorder (RBD)
- B. Micrographia
- C. Hypophonia
- D. All of the above

Restless legs and rapid eye movement-behavioral disorder (RBD) often precede the onset of PD.

873 Cause of neuropsychiatric symptoms in PD can be ?*Harrison's 17th Ed. 2551*

- A. Accompanying Alzheimer's disease (AD)
- B. Accompanying cortical dementia with Lewy bodies (DLB)
- C. Side effect of pharmacotherapy
- D. All of the above

Neuropsychiatric symptoms of later stages of PD may be direct result of PD or accompanying Alzheimer's disease, cortical dementia with Lewy bodies or as a side effect of its drugs.

874 Predictors of dementia in PD include all except ?*Harrison's 17th Ed. 2551*

- A. Early age of onset
- B. Akinetic rigid phenotype
- C. Presence of severe depression
- D. Persistent hallucinations

Predictors of dementia in PD include late age of onset, akinetic rigid phenotype, presence of severe depression, persistent hallucinations, and advanced stages of disease.

875 Which of the following is not a feature of essential tremor ?*Harrison's 17th Ed. 2553*

- A. Bilaterality

- B. Frequency of 8 to 10 Hz
- C. Postural dependency
- D. Aggravation with alcohol

Essential tremor (ET) presentation includes bilaterality, higher frequency (8 to 10 Hz), and postural dependency and significant relief with alcohol.

876 'Early appearance of hallucinations' favours which of the following diagnosis ?
Harrison's 17th Ed. 2553

- A. Parkinson's disease
- B. Wilson 's disease
- C. Cortical dementia with Lewy bodies (DLB)
- D. Alzheimer's disease

In DLB, parkinsonian features are compounded by early appearance of hallucinations or drug-induced hallucinations and disturbances in arousal and behavior.

877 'Early imbalance & falls' favours the diagnosis of ?
Harrison's 17th Ed. 2553

- A. Parkinson's disease
- B. Progressive supranuclear palsy (PSP)
- C. Cortical dementia with Lewy bodies (DLB)
- D. Multiple system atrophy (MSA)

The development of early imbalance and falls suggests progressive supranuclear palsy (PSP).

878 'Early urinary incontinence, orthostatic hypotension, and dysarthria' favours which of the following diagnosis ?
Harrison's 17th Ed. 2553

- A. Parkinson's disease
- B. Progressive supranuclear palsy (PSP)
- C. Cortical dementia with Lewy bodies (DLB)
- D. Multiple system atrophy (MSA)

The development of early urinary incontinence, orthostatic hypotension and dysarthria suggest multiple system atrophy (MSA).

879 Parkinsonian symptoms develop when striatal dopamine depletion reaches how much of normal ?
Harrison's 17th Ed. 2552

- A. 10 to 30 %
- B. 30 to 50 %
- C. 50 to 70 %
- D. 70 to 90 %

Symptoms develop when striatal dopamine depletion reaches 50 to 70 % of normal.

880 Which of the following symptoms respond poorly to therapy in PD ?
Harrison's 17th Ed. 2553

- A. Bradykinesia
- B. Abnormal posture
- C. Balance difficulties
- D. Rigidity

881 Which of the following symptoms respond poorly to therapy in PD ?
Harrison's 17th Ed. 2553

- A. Cognitive symptoms
- B. Abnormal posture

- C. Tremor
- D. Rigidity

Cognitive symptoms, hypophonia, autonomic dysfunction &balance difficulties respond poorly to symptomatic therapy. While, bradykinesia, tremor, rigidity & abnormal posture respond well.

882 Which of the following drugs has neuroprotective function in PD ?
Harrison's 17th Ed. 2557

- A. Levodopa
- B. Bromocryptine
- C. Selegiline
- D. Amantadine

Selegiline in addition to a mild symptomatic effect has a neuroprotective function. High doses of coenzyme Q₁₀, intrastriatal infusion of neurotrophic factors and exercise may be beneficial.

883 Which of the following drugs have the potential of a neuroprotective therapy in PD ?
Harrison's 18th Ed. 3324

- A. Selegiline
- B. Pramipexole
- C. Ropinirole
- D. All of the above

Rasagiline, selegiline, coenzyme Q10, pramipexole, and ropinirole are promising neuroprotection or disease modification agents in PD.

884 Which of the following is false for Dyskinesias in PD ?
Harrison's 17th Ed. 2554

- A. Choreiform and dystonic movements
- B. Occur as a peak dose effect
- C. Occur at the beginning or end of the dose
- D. None of the above

Dyskinesias refer to choreiform and dystonic movements that can occur as a peak dose effect or at the beginning or end of the dose (diphasic dyskinesias).

885 Dopamine agonists act directly on which of the following postsynaptic dopamine receptor ?
Harrison's 17th Ed. 2554

- A. D1 type
- B. D2 type
- C. D3 type
- D. D4 type

Dopamine agonists readily cross the blood-brain barrier and act directly on postsynaptic dopamine receptors - primarily D2 type.

886 Which of the following area of the brain is not protected by the blood-brain barrier (BBB) ?
J Neuroinflammation 2010; 7: 70

- A. Posterior pituitary gland
- B. Pineal gland
- C. Area postrema
- D. All of the above

Four areas of brain are not protected by the blood-brain barrier. These areas include posterior pituitary gland, pineal gland, median eminence of hypothalamus and area postrema. Area postrema (a paired circumventricular organ & vomiting center in medulla) is not covered by BBB because it senses toxins in blood that other parts of brain are protected from. Area postrema triggers nausea & vomiting to prevent further ingestion of toxins.

887 Which of the following statements is false ?

Harrison's 18th Ed. 3321

- A. Levodopa is a dopamine precursor
- B. Dopamine does not cross blood-brain barrier (BBB)
- C. Domperidone is a peripheral dopamine-blocking agent
- D. None of the above

888 Levodopa can be combined with ?

Harrison's 18th Ed. 3321

- A. Carbidopa
- B. Benserazide
- C. Entacapone
- D. All of the above

To prevent peripheral metabolism of levodopa to dopamine & development of nausea & vomiting due to activation of dopamine receptors in area postrema, levodopa is used in combination with peripheral decarboxylase inhibitor (carbidopa or benserazide) or COMT inhibitor (tolcapone or entacapone).

889 Which of the following statements about Levodopa is false ?

Harrison's 18th Ed. 3321

- A. Is a precursor of dopamine
- B. It is not metabolized centrally by dopa-decarboxylase
- C. It is metabolized peripherally by dopa-decarboxylase
- D. It is metabolized by COMT & MAO

Levodopa is a precursor of dopamine and is metabolized centrally & peripherally by dopa-decarboxylase, catechol-O-methyltransferase (COMT) and monoamine oxidase.

890 Which of the following antiparkinsonian drug is associated with valvular disease ?

Harrison's 17th Ed. 2555

- A. Levodopa
- B. Pergolide
- C. Pramipexole
- D. Rotigotine

Pergolide is associated with asymptomatic valvular disease on chronic administration.

891 Which of the following is not a 'Dopamine agonist' ?

Harrison's 18th Ed. 3323

- A. Levodopa
- B. Pergolide
- C. Bromocriptine
- D. Pramipexole

892 Which of the following dopamine agonist is an ergot derivative ?

Harrison's 18th Ed. 3323

- A. Bromocriptine
- B. Pergolide
- C. Cabergoline
- D. All of the above

893 Which of the following dopamine agonist is a nonergot derivative ?

Harrison's 18th Ed. 3323

- A. Pramipexole
- B. Ropinirole

- C. Rotigotine
- D. All of the above

Dopamine agonists include ergot alkaloids like bromocriptine, cabergoline, lisuride and pergolide and second generation non-ergot alkaloids like pramipexole, ropinirole and rotigotine.

894 Which of the following is administered as a transdermal patch ?

Harrison's 18th Ed. 3323

- A. Pramipexole
- B. Ropinirole
- C. Rotigotine
- D. Levodopa

Rotigotine is administered as a once-daily transdermal patch.

895 Which of the following is used as a rescue agent for treatment of severe "off" episodes ?

Harrison's 18th Ed. 3323

- A. Apomorphine
- B. Ropinirole
- C. Pramipexole
- D. Levodopa

Apomorphine is a dopamine agonist but must be administered parenterally (SC/continuous infusion) and is used as a rescue agent for the treatment of severe "off" episodes.

896 What amount of carbidopa is necessary to block peripheral levodopa decarboxylation into dopamine ?

Harrison's 17th Ed. 2556

- A. 10 mg/day
- B. 25 mg/day
- C. 50 mg/day
- D. 75 mg/day

Mostly, 75 mg/day of carbidopa is necessary to block peripheral levodopa decarboxylation into dopamine.

897 MAO is responsible for the deactivation of ?

- A. Norepinephrine
- B. 5-hydroxytryptamine
- C. Dopamine
- D. All of the above

Intramitochondrial enzyme MAO is responsible for the deactivation of norepinephrine, 5-hydroxytryptamine, and dopamine.

898 Which of the following is a monoamine oxidase (MAO) B inhibitor ?

Harrison's 18th Ed. 3324

- A. Pramipexole
- B. Pergolide
- C. Selegiline
- D. Entacapone

Selegiline & rasagiline are selective & irreversible monoamine oxidase (MAO) B inhibitor that block central dopamine metabolism & increase its synaptic concentration. They do not functionally inhibit MAO-A.

899 Which of the following is a monoamine oxidase (MAO) inhibitor ?

Harrison's 18th Ed. Chapter e26

- A. Furazolidone
- B. Cycloserine
- C. Clarithromycin

D. Amikacin

Furazolidone inhibits monoamine oxidase (MAO) gradually over several days.

900 Which of the following is a monoamine oxidase (MAO) inhibitor ?

Harrison's 18th Ed. 1378

- A. Linezolid
- B. Rifapentine
- C. Clarithromycin
- D. Capreomycin

Linezolid is a weak MAO inhibitor and can be associated with the serotonin syndrome when given concomitantly with serotonergic drugs (SSRI). Iproniazid was the first antidepressant introduced and is a MAOI anti-tuberculous drug.

901 Which of the following is not a MAO inhibitor ?

Harrison's 18th Ed. 3324

- A. Isocarboxazid
- B. Phenelzine
- C. Tetrabenazine
- D. Tranylcypromine

MAO inhibitors include selegiline, isocarboxazid, phenelzine and tranylcypromine. The last three are irreversible enzyme inhibitors that binds to MAO covalently, destroying its function forever.

902 With MAO inhibitors, tyramine-induced hypertensive crisis is named as ?

Harrison's 18th Ed. 3324

- A. Alcohol effect
- B. Diet effect
- C. Cheese effect
- D. Wine effect

Inhibition of MAO-A prevents metabolism of tyramine in gut, leading to a potentially fatal hypertensive reaction known as a "cheese effect" as it can be precipitated by foods rich in tyramine (some cheeses, aged meats & red wine).

903 MAO catabolizes which of the following ?

Cleveland Clinic Journal of Medicine 2010;77;860

- A. Norepinephrine
- B. Serotonin
- C. Dopamine
- D. All of the above

MAO is a flavin-containing enzyme critical for regulating neurotransmitter levels by catabolizing endogenous monoamines (NE, serotonin & dopamine) & exogenous amines (dietary tyramine). MAO exists in two subtypes, A & B. MAO-A preferentially metabolizes serotonin (5-HT) & NE. MAO-B preferentially metabolizes trace amines, including phenethylamine. MAO-A & MAO-B metabolize DA & tyramine.

904 Which of the following have only MAO-B ?

Cleveland Clinic Journal of Medicine 2010;77;860

- A. Intestine
- B. Brain
- C. Platelets
- D. Liver

MAO-A is the major enzyme outside of brain, with the exception of platelets and lymphocytes, which have only MAO-B. Ratio of MAO-A to MAO-B in human brain is 25%:75%, whereas in liver, ratio is 50%:50%, in intestine, ratio is 80%:20% & in peripheral adrenergic neurons, ratio is 90%:10%.

905 Which of the following is a selective MAO-A inhibitor ?

Cleveland Clinic Journal of Medicine 2010;77;860

- A. Phenelzine

B. Isocarboxazid

C. Clorgyline

D. Moclobemide

Nonselective MAO inhibitors are phenelzine, isocarboxazid & tranylcypromine. Selegiline is selective for MAO-B. Clorgyline is selective for MAO-A. Moclobemide is a reversible MAO inhibitor.

906 Which of the following is a Catechol O-methyltransferase (COMT) inhibitor ?

Harrison's 18th Ed. 3324

- A. Selegiline
- B. Entacapone
- C. Bromocriptine
- D. Pergolide

Entacapone and tolcapone are catechol O-methyltransferase (COMT) inhibitors. They augment the effects of levodopa by blocking enzymatic degradation of levodopa and dopamine.

907 Discoloration of urine can be due to which of the following drugs ?

Harrison's 18th Ed. 3324

- A. Selegiline
- B. Entacapone
- C. Bromocriptine
- D. Pergolide

Though not of clinical concern, discoloration of urine can be seen with both COMT inhibitors (tolcapone and entacapone) due to accumulation of a metabolite.

908 Livedo reticularis is the side effect of ?

Harrison's 18th Ed. 3324

- A. Selegiline
- B. Amantadine
- C. Bromocriptine
- D. Pergolide

Amantadine is a weak NMDA-receptor antagonist. Its side effects are livido reticularis, weight gain, and impaired cognitive function.

909 The only oral agent that reduces dyskinesia while improving parkinsonian features is ?

Harrison's 18th Ed. 3324

- A. Selegiline
- B. Amantadine
- C. Bromocriptine
- D. Pergolide

Amantadine, an antiviral agent, is the only oral agent that reduces dyskinesia while improving parkinsonian features.

910 Deep brain stimulation (DBS) for PD primarily targets which of the following ?

Harrison's 18th Ed. 3325

- A. Ventrolateral thalamus
- B. Subthalamic nucleus (STN)
- C. Substantia nigra, pars compacta
- D. Motor cortex

DBS for PD primarily targets subthalamic nucleus (STN) or internal segment of globus pallidus (GPi).

911 In gene therapy for PD, which of the following is used as viral vector ?

Harrison's 18th Ed. 3325

- A. AAV1
- B. AAV2
- C. AAV3
- D. AAV4

Gene therapy involves viral vector delivery of DNA of a therapeutic protein to specific target regions. The AAV2 virus is used as viral vector as it does not cause inflammatory response, is not incorporated into host genome, and is associated with long-lasting transgene expression.

912 In patients of PD with psychotic symptoms, which of the following drug is preferred ?

Harrison's 18th Ed. 3326

- A. Quetiapine
- B. Clozapine
- C. Risperidone
- D. Olanzapine

Quetiapine is recommended because it lacks the risk of agranulocytosis associated with clozapine. Risperidone, olanzapine and aripiprazole are not well tolerated by most patients with PD due to a higher incidence of drug-induced parkinsonism (DIP) and akathisia.

913 Which of the following is a clinical phenotype of MSA ?

Harrison's 16th Ed. 2413

- A. Striatonigral degeneration (SND)
- B. Olivopontocerebellar atrophy (OPCA)
- C. Progressive autonomic failure (PAF)
- D. All of the above

Clinical phenotype of MSA can be striatonigral degeneration (SND), olivopontocerebellar atrophy (OPCA) & progressive autonomic failure (PAF).

914 Bell's reflex refers to ?

Harrison's 16th Ed. 2414

- A. Elevation & adduction of eyes on attempted lid closure
- B. Elevation & abduction of eyes on attempted lid closure
- C. Depression & adduction of eyes on attempted lid closure
- D. Depression & abduction of eyes on attempted lid closure

Bell's reflex refers to elevation & abduction of eyes on attempted lid closure.

915 In PSP, neurofibrillary tangles are histochemically positive for which of the following ?

Harrison's 16th Ed. 2414

- A. Tau
- B. Amyloid
- C. α -synuclein
- D. All of the above

Pathologically, PSP is characterized by deposition of neurofibrillary tangles histochemically positive for tau and negative for amyloid or α -synuclein.

916 Which of the following best relate to hyperkinetic movement disorders ?

Harrison's 18th Ed. 3327

- A. Voluntary
- B. Involuntary
- C. Seizure

D. Passive

Hyperkinetic movement disorders are characterized by involuntary movements occurring in isolation or in combination.

917 Which of the following is not a kind of tremor ?

Harrison's 18th Ed. 3327

- A. Rest tremor
- B. Kinetic tremor
- C. Akinetic tremor
- D. Postural tremor

Tremor consists of alternating contractions of agonist & antagonist muscles in an oscillating, rhythmic manner. It can be most prominent at rest (rest tremor), on assuming a posture (postural tremor), or on actively reaching for a target (kinetic tremor).

918 PD is characterized by which of the following tremor ?

Harrison's 18th Ed. 3327

- A. Rest tremor
- B. Kinetic tremor
- C. Postural tremor
- D. All of the above

919 Essential tremor (ET) is characterized by which of the following tremor ?

Harrison's 18th Ed. 3327

- A. Rest tremor
- B. Kinetic tremor
- C. Postural tremor
- D. All of the above

920 Cerebellar disease is characterized by which of the following tremor ?

Harrison's 18th Ed. 3327

- A. Rest tremor
- B. Kinetic tremor
- C. Postural tremor
- D. All of the above

PD is characterized by a resting tremor, essential tremor (ET) by a postural tremor, and cerebellar disease by an intention or kinetic tremor.

921 Enhanced physiologic tremor (EPT) can be seen with the use of ?

Harrison's 18th Ed. 3328

- A. Valproate
- B. Lithium
- C. Alcohol
- D. All of the above

Enhanced physiologic tremors (EPT) are mild, high-frequency, postural or action tremors usually of no clinical consequence seen in anxiety, fatigue, hyperthyroidism, electrolyte abnormalities, valproate, lithium, or alcohol.

922 Which part of the body is affected most in essential tremor (ET) ?

Harrison's 18th Ed. 3328

- A. Arms
- B. Head
- C. Legs
- D. Larynx

Essential tremor (ET) is the most common movement disorder characterized by 6- to 12-Hz postural & kinetic tremor affecting the upper extremities mostly.

923 All of the following can aggravate essential tremors except ?

Harrison's 18th Ed. 3328

- A. Valproic acid
- B. Tricyclic antidepressants
- C. Alcohol
- D. Serotonin reuptake blockers

Alcohol consumption reduces ET. Stress and drugs that can aggravate any tremor include valproic acid, lithium, beta-adrenergic agonists, methylxanthines, thyroxine, glucocorticoids, tricyclic antidepressants, and serotonin reuptake blockers.

924 Association with which of the following gene is found in patients with young-onset ET ?

Harrison's 18th Ed. 3328

- A. PLOD1 gene
- B. LINGO1 gene
- C. COL1A1 gene
- D. TNXB gene

Association with LINGO1 gene is found in patients with young-onset ET.

925 Drugs that have usefulness in treatment of essential tremors include all except ?

Harrison's 18th Ed. 3328

- A. Primidone
- B. Propranolol
- C. Valproic acid
- D. Gabapentin

Primidone and propranolol are the first-line treatments for ET. Additional useful medications, with or without the primary agents, include benzodiazepines, gabapentin, topiramate, and botulinum toxin injections to affected muscle groups. Surgical therapies targeting the VIM nucleus of the thalamus can be very effective for severe and drug-resistant cases.

926 Which of the following statements is false about dystonia ?

Harrison's 18th Ed. 3328

- A. Co-contraction of agonist and antagonist muscles
- B. Appear during attempted voluntary movement
- C. Exacerbated by stress and fatigue
- D. None of the above

Co-contraction of agonist and antagonist muscles is a fundamental feature of dystonia and characteristically present during attempted voluntary movement. Dystonia is exacerbated by stress and fatigue and attenuated by sensory inputs [touching affected body part (geste antagoniste)].

927 Mutation in DYT1 gene on chromosome 9q34 results in which of the following dystonia ?

Harrison's 18th Ed. 3328

- A. Dopa responsive dystonia (DRD)
- B. Idiopathic torsion dystonia (ITD)
- C. Myoclonic dystonia
- D. Lubag form of dystonia-parkinsonism

Idiopathic torsion dystonia (ITD) or Oppenheim's dystonia is a primary dystonia of childhood-onset with autosomal dominant inheritance linked to a mutation in DYT1 gene located on chromosome 9q34 resulting in a trinucleotide GAG deletion with loss of one of a pair of glutamic acid residues in the protein torsin A.

928 Any patient suspected of having a childhood-onset dystonia should receive a trial of ?

Harrison's 18th Ed. 3329

- A. Valproate
- B. Lithium

C. Levodopa

D. Serotonin reuptake blockers

Any patient suspected of having a childhood-onset dystonia should receive a trial of levodopa to exclude Dopa responsive dystonia (DRD) or the Segawa variant (DYT5).

929 Dystonia frequently accompanied by psychiatric disturbances goes in favour of ?

Harrison's 18th Ed. 3329

- A. Idiopathic torsion dystonia (ITD)
- B. Myoclonic dystonia
- C. Lubag form of dystonia-parkinsonism
- D. Dopa responsive dystonia (DRD)

Myoclonic dystonia (DYT11) results from a mutation in epsilon-sarcoglycan gene on chromosome 7q21. It typically manifests as a combination of dystonia and myoclonic jerks, frequently accompanied by psychiatric disturbances.

930 Which of the following is a focal dystonia ?

Harrison's 18th Ed. 3329

- A. Blepharospasm
- B. Torticollis
- C. Meige's syndrome
- D. All of the above

Most common forms of dystonia are in adults - blepharospasm, cervical dystonias (torticollis, anterocollis, retrocollis), oromandibular dystonia, spasmodic dysphonia. The combination of lower facial and jaw dystonia is called Meige's syndrome.

931 Which of the following is a combination of oromandibular dystonia (OMD) and blepharospasm ?

Harrison's 18th Ed. 3329

- A. Dopa responsive dystonia (DRD)
- B. Idiopathic torsion dystonia (ITD)
- C. Meige's syndrome
- D. Lubag form of dystonia-parkinsonism

Meige syndrome is a combination of oromandibular dystonia (OMD) and blepharospasm.

932 Which of the following is an x-linked recessive dystonia parkinsonism ?

Harrison's 18th Ed. 3329

- A. Huntington's disease
- B. Lubag form of dystonia parkinsonism
- C. Leigh's disease
- D. All of the above

Lubag is an x-linked recessive dystonia parkinsonism that affects Filipino men originating principally from the Panay Island. Linkage analysis has confirmed the mode of inheritance and localized the disease gene to the proximal long arm of the x-chromosome.

933 Dystonia can occur as a part of which neurodegenerative condition ?

Harrison's 18th Ed. 3329

- A. HD
- B. PD
- C. Wilson's disease
- D. All of the above

Dystonia plus syndromes refer to dystonia occurring as a part of neurodegenerative conditions like HD, PD, Wilson's disease, CBGD, PSP, Lubag form of dystonia-parkinsonism (DYT3), and mitochondrial encephalopathies. Dystonia is usually not the dominant neurologic feature.

934 Most effective treatment for generalized primary dystonia is ?

Harrison's 18th Ed. 3329

- A. Primidone
- B. Propranolol
- C. Valproic acid
- D. Anticholinergic drugs

Anticholinergic drugs are the most effective forms of treatment for generalized primary dystonia.

935 Which of the following is most characteristic feature of HD ?

Harrison's 18th Ed. 3330

- A. Gait disturbance
- B. Chorea
- C. Oculomotor abnormalities
- D. Myoclonus

HD is characterized by rapid, nonpatterned, semipurposeful, involuntary choreiform movements. Dysarthria, gait disturbance, and oculomotor abnormalities are common features. As disease progresses, chorea is reduced & dystonia, rigidity, bradykinesia, myoclonus, and spasticity emerge.

936 Westphal variant of Huntington's disease (HD) relates to which of the following ?

Harrison's 18th Ed. 3330

- A. Alzheimer's disease
- B. Parkinsonian syndrome
- C. Orthostatic hypotension
- D. Dementia

HD can present as an akinetic-rigid or parkinsonian syndrome (Westphal variant).

937 Which of the following is a typical MRI finding in Huntington's Disease (HD) ?

Harrison's 18th Ed. 3330

- A. Hypointensity of the caudate head
- B. Progressive atrophy of caudate nuclei
- C. Iron accumulation in striatum
- D. Atrophy of the midbrain

HD predominantly strikes striatum. Progressive atrophy of caudate nuclei and consequent enlargement of lateral ventricles is visualized by MRI.

938 George Huntington belonged to which country ?

Harrison's 18th Ed. 3330

- A. Great Britain
- B. America
- C. Australia
- D. Canada

Huntington's disease (HD) was described by George Huntington, an American physician in 1872. Huntington's gene is single, causal gene and an accurate genetic test for HD is available.

939 Huntington's disease (HD) is caused by mutations in the Huntington's gene on the ?

Harrison's 18th Ed. 3312, 3330

- A. Short arm of chromosome 4
- B. Long arm of chromosome 4
- C. Short arm of chromosome 5
- D. Long arm of chromosome 5

HD is caused by mutations in the Huntington's gene on the short arm of chromosome 4.

940 Sydenham's choreas responds to which of the following ?

Harrison's 18th Ed. 3331

- A. Dopamine-blocking agents
- B. Valproic acid
- C. Carbamazepine
- D. All of the above

Sydenham's chorea (St. Vitus' dance) is of acute onset and responds to dopamine-blocking agents, valproic acid, and carbamazepine. Chorea may recur in later life, particularly in association with pregnancy (chorea gravidarum) or treatment with sex hormones.

941 Disorders having excess brain iron accumulation on MRI include all except ?

Harrison's 18th Ed. 3331

- A. Autosomal dominant neuroferritinopathy
- B. Hallervorden-Spatz disease
- C. Neuroacanthocytosis
- D. Aceruloplasminemia

Neurodegenerative diseases with brain iron accumulation (NBIA) manifesting with chorea include autosomal dominant neuroferritinopathy, autosomal recessive pantothenate-kinase-associated neurodegeneration (PKAN; Hallervorden-Spatz disease), and aceruloplasminemia. Iron accumulation in globus pallidus provides on MRI the characteristic "eye of the tiger" appearance.

942 Most common systemic disorder that causes chorea is ?

Harrison's 18th Ed. 3331

- A. Hyperthyroidism
- B. HIV disease
- C. Systemic lupus erythematosus (SLE)
- D. Polycythemia rubra vera

Systemic lupus erythematosus is the most common systemic disorder that causes chorea. Chorea can also be seen with hyperthyroidism, Sjögren's syndrome, HIV disease, metabolic alterations, polycythemia rubra vera, with many medications (anticonvulsants, cocaine, CNS stimulants, estrogens, lithium) and paraneoplastic syndromes associated with anti-CRMP-5 or anti-Hu antibodies.

943 In hemiballismus, most often the lesion is in ?

Harrison's 18th Ed. 3332

- A. Globus pallidus
- B. Cerebellum
- C. Subthalamic nucleus
- D. Pedunclopontine nucleus

Most common cause of hemiballismus is a lesion (infarct or hemorrhage) of subthalamic nucleus (STN) and rarely in putamen.

944 Which of the following best relates to hemiballismus ?

Harrison's 18th Ed. 3332

- A. Chorea
- B. Athetosis
- C. Choreoathetosis
- D. Any of the above

Hemiballismus is a violent form of chorea composed of wild, flinging, large-amplitude movements of proximal limb muscles on one side of the body.

945 Which of the following is a neurobehavioral disorder ?

Harrison's 18th Ed. 3332

- A. Essential tremor (ET)
- B. Wilson's disease
- C. Huntington's disease (HD)

D. Tourette's Syndrome (TS)

Tourette's Syndrome (TS) is a neurobehavioral disorder named after French neurologist Georges Gilles de la Tourette.

946 Associated behavioral disturbance with Tourette's Syndrome (TS) include ?

Harrison's 18th Ed. 3332

- A. Anxiety, depression
- B. Attention deficit hyperactivity disorder
- C. Obsessive-compulsive disorder
- D. All of the above

Associated behavioral disturbances with Tourette's Syndrome (TS) include anxiety, depression, attention deficit hyperactivity disorder, and obsessive-compulsive disorder.

947 Which of the following is a kind of vocal tic ?

Harrison's 18th Ed. 3332

- A. Echolalia
- B. Palilalia
- C. Coprolalia
- D. All of the above

Vocal tics include grunting, echolalia (repeating other people's words), palilalia (repeating one's own words), and coprolalia (expression of obscene words).

948 Effective medication in the treatment of Tourette's Syndrome is ?

Harrison's 18th Ed. 3332

- A. Clonidine
- B. Guanfacine
- C. Olanzapine
- D. All of the above

Clonidine, Guanfacine, Atypical neuroleptics (risperidone, olanzapine, ziprasidone) and classical neuroleptics (haloperidol, fluphenazine, or pimozide) are useful in treatment of TS.

949 Which of the following about myoclonus is false ?

Harrison's 18th Ed. 3332

- A. Rapid, jerky movement of <100 msec. duration
- B. Asterixis is a negative myoclonus
- C. Interferes with normal movement
- D. Suppressible

Myoclonus is a rapid, jerky movement of <100 msec. duration due to single or repetitive muscle discharges. It occur spontaneously, in association with voluntary movement (action myoclonus) or in response to an external stimulus (reflex or startle myoclonus). Negative myoclonus consists of a twitch due to a brief loss of muscle activity (asterixis in hepatic failure). Myoclonic jerks differ from tics in that they interfere with normal movement and are not suppressible.

950 Myoclonus can be seen in association with pathology in ?

Harrison's 18th Ed. 3332

- A. Cortical region
- B. Subcortical region
- C. Spinal cord region
- D. All of the above

Myoclonus can be seen in association with pathology in cortical, subcortical, or spinal cord regions and associated with hypoxemic damage, encephalopathy, and neurodegeneration.

951 Which of the following is useful in the treatment of myoclonus ?

Harrison's 18th Ed. 3333

- A. Valproic acid
- B. Piracetam

C. Levetiracetam

D. All of the above

Treatment primarily consists of treating the underlying condition or removing offending agent. Valproic acid, piracetam, clonazepam, primidone and levetiracetam may be effective.

952 Which of the following is an example of Dystonia ?

Harrison's 18th Ed. 3333

- A. Blepharospasm
- B. Torticollis
- C. Oromandibular dystonia
- D. All of the above

Dystonia is the most common acute hyperkinetic drug reaction. It is typically generalized in children and focal in adults like blepharospasm, torticollis, or oromandibular dystonia.

953 Which of the following about tardive dyskinesia (TD) is false ?

Harrison's 18th Ed. 3333

- A. Choreiform movements
- B. Mouth, lips, and tongue mostly involved
- C. Tetrabenazine helpful in refractory cases
- D. None of the above

954 Use of metoclopramide for more than how many weeks increases the risk of tardive dyskinesia (TD) ?

Harrison's 18th Ed. 3333

- A. 2 weeks
- B. 4 weeks
- C. 6 weeks
- D. 12 weeks

FDA has warned that use of metoclopramide for more than 12 weeks increases the risk of TD.

955 Levels of which of the following is markedly elevated in neuroleptic malignant syndrome (NMS) ?

Harrison's 18th Ed. 3333

- A. Creatine kinase
- B. Lactic dehydrogenase
- C. Lactic acid
- D. All of the above

Neuroleptic malignant syndrome (NMS) is characterized by muscle rigidity, elevated temperature, altered mental status, hyperthermia, tachycardia, labile blood pressure, renal failure, and markedly elevated creatine kinase levels. Myoclonus is not a feature of NMS but of serotonin syndrome.

956 Myoclonus can result with the use of which of the following drugs ?

Harrison's 18th Ed. 3333

- A. Phenytoin
- B. Fluoxetine
- C. Buspirone
- D. All of the above

Drugs can be associated with parkinsonism & hyperkinetic movement disorders like phenytoin (chorea, dystonia, tremor, myoclonus), carbamazepine (tics and dystonia), tricyclic antidepressants (dyskinesias, tremor, myoclonus), fluoxetine (myoclonus, chorea, dystonia), oral contraceptives (dyskinesia), adrenergics (tremor), buspirone (akathisia, dyskinesias, myoclonus), and digoxin, cimetidine, diazoxide, lithium, methadone, and fentanyl (dyskinesias).

957 Restless Legs Syndrome was first described by ?

Harrison's 18th Ed. 3334

- A. Christopher Ross

- B. Micheal Emre
- C. Thomas Willis
- D. James Hardy

Restless legs syndrome (RLS) is a neurologic disorder and was first described in seventeenth century by English physician Thomas Willis.

958 Secondary RLS may be associated with ?

Harrison's 18th Ed. 3334

- A. Pregnancy
- B. Peripheral neuropathy
- C. Renal failure
- D. All of the above

Secondary RLS may be associated with pregnancy, anemia, ferritin deficiency, renal failure, and peripheral neuropathy.

959 Which of the following in Wilson's disease can manifest alone ?

Harrison's 18th Ed. 3334

- A. Neurologic disorders
- B. Psychiatric disorders
- C. Liver disorders
- D. Any of the above

Wilson's disease (WD) is an autosomal recessive inherited disorder of copper metabolism that may manifest with neurologic, psychiatric, and liver disorders, alone or in combination. About half of WD patients (esp. younger patients) manifest with liver abnormalities.

960 Kayser-Fleischer (KF) rings are seen in nearly what proportion of WD patients with hepatic presentations ?

Harrison's 18th Ed. 3334

- A. 20 %
- B. 40 %
- C. 80 %
- D. 100 %

Kayser-Fleischer (KF) rings are seen in 80% of WD patients with hepatic presentations.

961 Kayser-Fleischer (KF) rings are seen in nearly what proportion of WD patients with neurologic features ?

Harrison's 18th Ed. 3334

- A. 20 %
- B. 40 %
- C. 80 %
- D. 100 %

Kayser-Fleischer (KF) rings are seen in nearly all WD patients with neurologic features. It is very rare for WD patients with neurologic features not to have KF rings.

962 Which of the following statements about Kayser-Fleischer (KF) rings is false ?

Harrison's 18th Ed. 3334

- A. Represent deposition of copper in Descemet's membrane
- B. Brownish discoloration of the peripheral cornea
- C. Best detected by slit-lamp examination
- D. None of the above

Kayser-Fleischer rings (KF rings) represent the deposition of copper in Descemet's membrane producing brownish discoloration of peripheral cornea. They are best detected by slit-lamp examination.

963 Which of the following marks the onset of neurologic manifestations in WD ?

Harrison's 18th Ed. 3334

- A. Bradykinesia
- B. Tremor
- C. Dystonia
- D. Dysarthria

Neurologic onset usually manifests in the second decade with tremor and rigidity. Tremor is usually in upper limbs, bilateral, and asymmetric.

964 In WD, which of the following is false ?

Harrison's 18th Ed. 3334

- A. Low levels of blood copper
- B. Low levels of blood ceruloplasmin
- C. High levels of urinary copper
- D. None of the above

In WD, low levels of blood copper and ceruloplasmin and high levels of urinary copper are found but normal levels do not exclude the diagnosis.

965 In WD, MRI shows symmetric hyperintensity on T2-weighted images in ?

Harrison's 18th Ed. 3334

- A. Putamen
- B. Caudate
- C. Pallidum
- D. All of the above

In WD, MRI shows symmetric hyperintensity on T2-weighted images in putamen, caudate & pallidum.

966 Which of the following is the gold standard for the diagnosis of WD ?

Harrison's 18th Ed. 3334

- A. Kayser-Fleischer (KF) rings
- B. Generalized atrophy on CT brain scan
- C. Hyperintensity of putamen on T2-weighted MRI images
- D. High copper levels in liver biopsy

Liver biopsy with demonstration of high copper levels is the gold standard for diagnosis of WD.

967 Which of the following blocks the absorption of copper ?

Harrison's 18th Ed. 3334

- A. Penicillamine
- B. Tetrathiomolybdate
- C. Trientine
- D. Zinc

Tetrathiomolybdate blocks absorption of copper. Penicillamine increases copper excretion. Trientine & zinc are useful drugs for maintenance therapy.

968 Which of the following statements about Penicillamine is false ?

Harrison's 18th Ed. 3334

- A. Worsens symptoms in initial stages of therapy
- B. Increases copper excretion
- C. Should be coadministered with pyridoxine
- D. None of the above

969 Astasia-abasia is best related to ?

Harrison's 18th Ed. 3334

- A. Parkinsonism

- B. Cerebellar degeneration
- C. Psychogenic movement disorder
- D. Nystagmus

Asiasia-abasia refers to odd gyrations of posture with wastage of muscular energy, extreme slow motion, and dramatic fluctuations over time observed in patients with somatoform disorders and conversion reaction.

373 - Ataxic Disorders

970 **Sensory information for postural control is primarily generated by ?**

Harrison's 18th Ed. 192

- A. Visual system
- B. Vestibular system
- C. Proprioceptive receptors in muscle spindles & joints
- D. All of the above

Sensory information for postural control is primarily generated by visual system, vestibular system and by proprioceptive receptors in the muscle spindles and joints. Loss of two of the three pathways is compromises standing balance. Clinically, gait disorder must be viewed as the product of a neurologic deficit and a functional adaptation.

971 **“As if walking on a slippery surface” best relates to ?**

Harrison's 18th Ed. 193

- A. Cautious Gait
- B. Stiff-Legged Gait
- C. Freezing Gait
- D. Frontal Gait Disorder

Cautious gait refers to describe a patient who walks with an abbreviated stride & lowered center of mass, as if walking on a slippery surface. This disorder is both common and nonspecific.

972 **Which of the following is the commonest etiology of gait disorders ?**

Harrison's 17th Ed. Chapter 24

- A. Sensory deficits
- B. Parkinsonism
- C. Cerebellar degeneration
- D. Psychogenic

973 **Stiff-legged gait category includes which of the following ?**

Harrison's 18th Ed. 193

- A. Spastic gait
- B. Dystonia
- C. Stiff-person syndrome
- D. All of the above

974 **Causes of freezing gait include ?**

Harrison's 18th Ed. 193

- A. Parkinson's disease
- B. Progressive supranuclear palsy
- C. Corticobasal degeneration
- D. All of the above

Difficulty with gait initiation leads to a freezing gait seen in PD, progressive supranuclear palsy, multiple system atrophy, corticobasal degeneration & primary pallidal degeneration.

975 **Pill-rolling tremor is specific for ?**

Harrison's 18th Ed. 193

- A. Parkinson's disease

- B. Progressive supranuclear palsy
- C. Corticobasal degeneration
- D. All of the above

Patients of PSP, MSA and CBD frequently present with axial stiffness, postural instability, and a shuffling gait but lack the characteristic pill-rolling tremor of Parkinson's disease.

976 **“Gait apraxia” is characteristic of ?**

Harrison's 18th Ed. 193

- A. Sensory ataxia
- B. Cerebellar gait ataxia
- C. Frontal gait disorder
- D. Psychogenic gait disorder

Frontal gait disorder or “gait apraxia” features wide base of support, short stride, shuffling along floor and difficulty with starts & turns.

977 **Which of the following relate to frontal gait disorders ?**

Harrison's 18th Ed. 193

- A. Gait apraxia
- B. “Slipping clutch” syndrome
- C. Lower body parkinsonism
- D. All of the above

Difficulty with gait initiation is referred to as “slipping clutch” syndrome & lower body parkinsonism.

978 **Cerebellar gait ataxia is characterized by all except ?**

Harrison's 18th Ed. 193

- A. Unable to walk tandem heel to toe
- B. Difficulty in maintaining balance when turning
- C. Narrow base of support
- D. Falls is a late event

Cerebellar gait ataxia is characterized by a wide base of support, erratic foot placement, difficulty in maintaining balance on turning (an early feature) and tandem gait. Falls in daily life is a late event.

979 **Sensory ataxia is characterized by ?**

Harrison's 18th Ed. 193

- A. Stance destabilized by eye closure
- B. Look down at their feet when walking
- C. Joint position & vibration sense diminished in lower limbs
- D. All of the above

In sensory ataxia, stance is destabilized by eye closure. Patient looks down at their feet when walking and do poorly in dark. Joint position & vibration sense is diminished in lower limbs.

980 **Which of the following is a feature of vestibular disorder ?**

Harrison's 18th Ed. 195

- A. Vertigo
- B. Nystagmus
- C. Poor balance
- D. All of the above

Feature of vestibular disorders are vertigo (subjective appreciation or illusion of movement), nystagmus (vestibulo-oculomotor sign) & poor balance (impairment of vestibulo-spinal function).

981 **Symptoms & signs of true cerebellar ataxia consist of all except ?**

Harrison's 18th Ed. 195

- A. Gait impairment
- B. Hand incoordination

- C. Romberg sign
- D. Tremor with movement

Ataxia due to vestibular nerve or labyrinthine disease results in gait disorder associated with dizziness, light-headedness or perception of movement. Cerebellar ataxia presents as gait impairment, scanning speech, visual blurring due to nystagmus, hand incoordination and tremor with movement. True cerebellar ataxia is devoid of vertiginous complaints. In sensory ataxia, imbalance worsens when visual input is removed (Romberg sign).

982 Symptoms & signs of true cerebellar ataxia consist of all except ?

Harrison's 18th Ed. 195

- A. Nystagmus
- B. Scanning speech
- C. Dizziness
- D. Tremor with movement

Patients with hereditary ataxia or alcoholic cerebellar degeneration do not complain of dizziness.

983 Acute and reversible ataxia can occur due to which of the following ?

Harrison's 18th Ed. 3335

- A. Alcohol
- B. Phenytoin
- C. Lithium
- D. All of the above

Acute & reversible ataxia can result from intoxication with alcohol, phenytoin, lithium & barbiturates. Hypothyroidism must always be considered as a readily treatable and reversible form of chronic symmetric gait ataxia.

984 Which of the following may lead to development of ataxia of gait ?

Harrison's 18th Ed. 3336

- A. B₁ deficiency
- B. B₁₂ deficiency
- C. Hyponatremia
- D. All of the above

Subacute development of ataxia of gait may be due to vitamin B₁ and B₁₂ deficiency and hyponatremia.

985 Anti-Tr autoantibody is related to which of the following ?

Harrison's 18th Ed. 3336

- A. Breast cancer
- B. Ovarian cancer
- C. Small-cell lung cancer
- D. Hodgkin's disease

Paraneoplastic cerebellar ataxia may present with various tumor states. Autoantibodies related to breast and ovarian cancers is anti-Yo, with small-cell lung cancer is anti-PQ type voltage-gated calcium channel, and with Hodgkin's disease is anti-Tr.

986 Paraneoplastic Opsoclonus-Myoclonus Syndrome is related to which of the following ?

Harrison's 18th Ed. 3336

- A. Breast cancer
- B. Lung cancer
- C. Neuroblastoma
- D. All of the above

Opsoclonus is a disorder of eye movement characterized by involuntary, chaotic saccades that occur in all directions of gaze frequently associated with myoclonus & ataxia. When the cause of opsoclonus-myoclonus is paraneoplastic, tumors involved are usually cancer of lung and breast in adults and neuroblastoma in children.

987 True cerebellar ataxia result from the involvement of ?

Harrison's 17th Ed. 2565

- A. Cerebellum
- B. Spinocerebellar pathway
- C. Frontopontocerebellar pathway
- D. All of the above

True cerebellar ataxia result from involvement of cerebellum, spinocerebellar pathways and frontopontocerebellar pathway from rostral frontal lobe.

988 Patients with which of the following disorder fall over backwards ?

Harrison's 18th Ed. 195

- A. Progressive supranuclear palsy
- B. Cerebellar pathology
- C. Lesions of the vestibular system
- D. Patients with somatosensory deficits

Patients with cerebellar pathology may lean & topple toward side of lesion. Patients with lesions of vestibular system have lateral pulsion & toppling falls. Patients with progressive supranuclear palsy fall over backwards. Gait freezing in Parkinson's disease results in a forward fall.

989 Which of the following is not a cause of symmetric ataxia ?

Harrison's 18th Ed. 3336 Table 373-1

- A. Inherited ataxia
- B. Hypothyroidism
- C. Multiple sclerosis
- D. Meningovascular syphilis

Demyelinating disease multiple sclerosis presents with focal and ipsilateral cerebellar signs of subacute duration (days to weeks).

990 Which of the following drugs can cause symmetric ataxia ?

Harrison's 18th Ed. 3336

- A. Phenytoin
- B. Lithium
- C. Barbiturates
- D. All of the above

991 Paraneoplastic cerebellar ataxia is associated with ?

Harrison's 18th Ed. 3336

- A. Breast cancer
- B. Small-cell lung cancer
- C. Hodgkin's disease
- D. All of the above

Paraneoplastic cerebellar ataxia is associated with breast and ovarian cancers (anti-Yo), small-cell lung cancer (anti-PQ type voltage-gated calcium channel), and Hodgkin's disease (anti-Tr).

992 Paraneoplastic syndrome associated with myoclonus and opsoclonus occurs with ?

Harrison's 18th Ed. 3336

- A. Breast cancer
- B. Lung cancer
- C. Neuroblastoma
- D. All of the above

Paraneoplastic syndrome associated with myoclonus and opsoclonus occurs with breast cancer (anti-Ri), lung cancer and neuroblastoma.

993 Which of the following is caused by an untranslated pentanucleotide repeat ?

Harrison's 18th Ed. 3341

- A. SCA6
- B. SCA7
- C. SCA10
- D. SCA17

Autosomal spinocerebellar ataxias (SCAs) include SCA types 1 through SCA28, dentatorubropallidoluysian atrophy (DRPLA) & episodic ataxia (EA) types 1 and 2. SCA1, SCA2, SCA3 [Machado-Joseph disease (MJD)], SCA6, SCA7, and SCA17 are caused by CAG triplet repeat expansions in different genes. SCA8 is due to an untranslated CTG repeat expansion, SCA12 is linked to an untranslated CAG repeat, and SCA10 is caused by an untranslated pentanucleotide repeat.

994 Ataxins are ?

Harrison's 18th Ed. 3341

- A. Expanded polyserine proteins
- B. Expanded polyglutamine proteins
- C. Expanded polyarginine proteins
- D. Expanded polyileucine proteins

CAG encodes glutamine & expanded CAG triplet repeat expansions in SCA's result in expanded polyglutamine proteins, termed ataxins, that produce a toxic gain of function with autosomal dominant inheritance.

995 About what number of glutamines due to expanded polyglutamine ataxins are potentially toxic to neurons ?

Harrison's 18th Ed. 3341

- A. 10
- B. 20
- C. 30
- D. 40

Expanded polyglutamine ataxins with more than ~40 glutamines are potentially toxic to neurons. They impair neuronal functions, alter efficiency of ubiquitin-proteasome system of protein turnover and induce neuronal apoptosis.

996 Which of the following is a CAG repeat disease ?

Harrison's 18th Ed. 3341

- A. Machado-Joseph Disease (MJD)
- B. Huntington's disease
- C. Dentatorubral-pallidoluysian atrophy (DRPLA)
- D. All of the above

Besides Machado-Joseph Disease (MJD), other CAG repeat diseases include Huntington's disease, dentatorubral-pallidoluysian atrophy (DRPLA) and X-chromosomal Spinobulbar Muscular Atrophy (SBMA or Kennedy's Disease). Other triplet repeat expansions diseases include Fragile X-syndrome (FRAXA) - CGG repeat, Fragile X-syndrome (FRAXE) - GCC repeat, Dystrophia myotonica (DM) - CTG repeat and Friedreich ataxia (FRDA1) - GAA repeat.

997 Which of the following about increase in number of "nucleotide repeats" is false ?

Harrison's 18th Ed. 3341

- A. Length correlates with severity of disease
- B. Repeat length increases from one generation to next
- C. Leads to anticipation
- D. None of the above

Nucleotide repeat expansion disorders are associated with an increase in number of nucleotide repeats above a threshold. Repeats alter gene regulatory sequences and tends to further expand during cell division. Length of nucleotide repeat correlates with severity of disease. Repeat length increases from one generation to the next, and disease manifests severely and at an earlier age -phenomenon called anticipation.

998 Dynamic mutation refers to ?

Harrison's 18th Ed. 503, Harrison's 18th Ed. 3341

- A. Decreasingly severe phenotype in next generation
- B. Increasingly severe phenotype in next generation
- C. Decreasingly severe genotype in next generation
- D. Increasingly severe genotype in next generation

In subsequent generations, expanded repeat may increase further in length & result in an increasingly severe phenotype - dynamic mutation.

999 Which of the following Trinucleotide Repeat Disorders has autosomal recessive inheritance ?

Harrison's 18th Ed. 503

- A. Spinocerebellar ataxia type 1 (SCA1)
- B. Machado Joseph disease (MJD)
- C. Dentorubral pallidoluysiane atrophy (DRPLA)
- D. Friedreich ataxia (FRDA1)

Friedreich ataxia (FRDA1) is GAA repeat autosomal recessive congenital ataxia.

1000 Which of the following was also called olivopontocerebellar atrophy ?

Harrison's 18th Ed. 3341

- A. Spinocerebellar ataxia 1
- B. Spinocerebellar ataxia 2
- C. Spinocerebellar ataxia 3
- D. Spinocerebellar ataxia 6

SCA1 was previously referred to as olivopontocerebellar atrophy.

1001 Which clinical phenotype of spinocerebellar ataxia has been described in patients from India ?

Harrison's 18th Ed. 3341

- A. Spinocerebellar ataxia 1
- B. Spinocerebellar ataxia 2
- C. Spinocerebellar ataxia 6
- D. Spinocerebellar ataxia 7

Clinical phenotype of spinocerebellar ataxia (SCA2) has been described in patients from Cuba and India.

1002 Which out of the following is the most common inherited autosomal dominant ataxia ?

Harrison's 18th Ed. 3342

- A. Spinocerebellar ataxia 1
- B. Spinocerebellar ataxia 2
- C. Spinocerebellar ataxia 3
- D. Spinocerebellar ataxia 6

In most populations, Machado-Joseph Disease (MJD) or spinocerebellar ataxias 3 is the most common autosomal dominant ataxia.

1003 Most common form of inherited ataxia is ?

Harrison's 18th Ed. 3343

- A. Machado-Joseph Disease (MJD)
- B. Friedreich's Ataxia
- C. Dentatorubropallidoluysian atrophy (DRPLA)
- D. Episodic ataxia

Friedreich's Ataxia is the most common form of inherited ataxia, comprising 1/2 of all hereditary ataxias.

1004 Amyotrophic lateral sclerosis - parkinsonism - dystonia type presentation is in which clinical type of MJD ?

Harrison's 18th Ed. 3342

- A. Type I MJD
- B. Type II MJD
- C. Type III MJD
- D. None of the above

1005 Ataxic type presentation is seen in which type of MJD ?

Harrison's 18th Ed. 3342

- A. Type I MJD
- B. Type II MJD
- C. Type III MJD
- D. None of the above

1006 Ataxic-amyotrophic type presentation is seen in which clinical type of MJD ?

Harrison's 18th Ed. 3342

- A. Type I MJD
- B. Type II MJD
- C. Type III MJD
- D. None of the above

1007 Which is the most common clinical type of MJD ?

Harrison's 18th Ed. 3342

- A. Type I MJD
- B. Type II MJD
- C. Type III MJD
- D. All of the above

MJD is of three clinical types. Type I MJD - amyotrophic lateral sclerosis–parkinsonism–dystonia type, type II MJD - ataxic type, Type III MJD - ataxic-amyotrophic type. Type II is the most common form of MJD.

1008 The mean age of onset of symptoms in MJD is ?

Harrison's 18th Ed. 3342

- A. 5 years
- B. 10 years
- C. 15 years
- D. 25 years

The mean age of onset of symptoms in MJD is 25 years.

1009 Patients retain full intellectual function in which clinical type of MJD ?

Harrison's 18th Ed. 3342

- A. Type I MJD
- B. Type II MJD
- C. Type III MJD
- D. All of the above

Usually, MJD patients retain full intellectual function.

1010 Which of the following is spared in Machado-Joseph Disease (MJD) ?

Harrison's 18th Ed. 3342

- A. Inferior olives
- B. Corpus striatum
- C. Pars compacta of substantia nigra

D. Dentate nucleus of cerebellum

Sparing of the inferior olives distinguishes MJD from other dominantly inherited ataxias.

1011 Which of the following spinocerebellar ataxias (SCAs) has pure cerebellar presentation ?

Harrison's 16th Ed. 2422

- A. SCA1
- B. SCA2
- C. SCA3
- D. SCA5

SCA5 (autosomal dominant type 5) maps to chromosome 11 & presentation includes ataxia & dysarthria.

1012 'Retinal pigmentary degeneration' occurs in which of the following spinocerebellar ataxias (SCAs) ?

Harrison's 18th Ed. 3342

- A. SCA1
- B. SCA2
- C. Machado-Joseph disease
- D. SCA7

SCA7 is distinguished from all other SCAs by the presence of retinal pigmentary degeneration.

1013 The color blindness in SCA7 is for which colour ?

Harrison's 18th Ed. 3342

- A. Red-yellow
- B. Green-yellow
- C. Blue-yellow
- D. Any of the above

In SCA7, visual abnormalities first appear as blue-yellow color blindness and proceed to frank visual loss with macular degeneration.

1014 Haw River syndrome relates to which of the following ?

Harrison's 18th Ed. 3342

- A. Machado-Joseph Disease
- B. Dentatorubropallidoluysian atrophy (DRPLA)
- C. Friedreich's Ataxia
- D. Episodic Ataxia

Haw River Syndrome (HRS) is an autosomal dominant neurodegenerative disease that has affected five generations of an African-American family in rural North Carolina. It represents a unique spectrum of multiple system degenerations resembling Huntington's disease, spinocerebellar atrophy and dentatorubropallidoluysian atrophy (DRPLA), a neurodegenerative disease that is primarily reported in Japan. Cardinal features in adults are ataxia, choreoathetosis & dementia. Cardinal features in children are mental retardation, behavioral changes, myoclonus, and epilepsy. ATN1 (DRPLA) is the only gene associated with DRPLA.

1015 Gene related to Dentatorubropallidoluysian Atrophy is ?

Harrison's 18th Ed. 3342

- A. Dentatin
- B. Quadrupin
- C. Simplin
- D. Atrophin 1

DRPLA is due to unstable CAG triplet repeats in the open reading frame of a gene "atrophin" located on chromosome 12p12-ter.

1016 Which of the following spinocerebellar ataxias (SCAs) has presentation similar to Huntington disease (HD) ?

Harrison's 16th Ed. 2420

- A. SCA1

- B. SCA2
- C. SCA3
- D. SCA17

SCAs & HD show broad phenotypic overlap including ataxia, spasticity, Parkinsonian features, dystonia, chorea, dementia & mood disorders. Later three symptoms in a hereditary context should favor a genetic test for HD. Similar phenotypes have been observed in SCA17.

- 1017 Which of the following is not a potassium ion channelopathy ?
Harrison's 18th Ed. 3225 Table 366-1
- A. Episodic ataxia-1
 - B. Episodic ataxia-2
 - C. Benign neonatal familial convulsions
 - D. Jervell & Lange-Nielsen syndrome

Episodicataxia-2 is a calcium ion channelopathy.

- 1018 Which of the following is not a sodium ion channelopathy ?
Harrison's 18th Ed. 3225 Table 366-1
- A. Paramyotonia congenita
 - B. Hyperkalemic periodic paralysis
 - C. Hypokalemic periodic paralysis
 - D. Generalized epilepsy with febrile convulsions plus

- 1019 Which of the following is not a calcium ion channelopathy ?
Harrison's 18th Ed. 3225 Table 366-1
- A. Episodic ataxia-2
 - B. Spinocerebellar ataxia-6
 - C. Familial hemiplegic migraine
 - D. Autosomal dominant progressive deafness

- 1020 Neurologic genetic disorders inherited in Mendelian autosomal dominant mutations include all except ?
Harrison's 16th Ed. 2420
- A. Huntington's Disease (HD)
 - B. Familial Alzheimer's Disease
 - C. Amyotrophic lateral sclerosis (ALS)
 - D. Friedreich's ataxia (FA)

- 1021 Neurologic genetic disorders inherited in Mendelian autosomal dominant mutations include all except ?
Harrison's 16th Ed. 2420
- A. Dystrophia myotonica (DM)
 - B. Ataxia telangiectasia
 - C. Charcot-Marie-Tooth disease 1A (CMT 1A)
 - D. Familial Hyperkalemic periodic paralysis (HYPP)

- 1022 Neurologic genetic disorders inherited in Mendelian autosomal dominant mutations include all except ?
Harrison's 16th Ed. 2420
- A. Spinocerebellar ataxia (SCA)
 - B. Tuberous sclerosis
 - C. Wilson's disease
 - D. Charcot-Marie-Tooth disease 1A (CMT 1A)

- 1023 Neurologic genetic disorders inherited as Mendelian autosomal recessive include all except ?
Harrison's 16th Ed. 2420
- A. Friedreich's ataxia (FA)

- B. Wilson's disease
- C. Tuberous sclerosis
- D. Ataxia telangiectasia

- 1024 Neurologic genetic disorders inherited as X-linked recessive traits include all except ?
Harrison's 16th Ed. 370, 2527
- A. Duchenne muscular dystrophy (DMD)
 - B. Spinobulbar muscular atrophy (SBMA)
 - C. Fragile X syndrome
 - D. Friedreich's ataxia (FA)

- 1025 Which of the following neurotransmitter function by signaling in a retrograde fashion - from postsynaptic to presynaptic cell ?
Harrison's 18th Ed. 3226
- A. Substance P
 - B. Enkephalin
 - C. Neuropeptide Y
 - D. Nitric oxide

Nitric oxide and carbon monoxide are gases that also function as neurotransmitters, in part by signaling in a retrograde fashion from postsynaptic to the presynaptic cell.

- 1026 Which of the following is false about neurotransmitter receptors ?
Harrison's 18th Ed. 3226
- A. Ionotropic receptors are direct ion channels
 - B. Metabotropic receptors interact with G proteins
 - C. Ionotropic receptors are single subunits
 - D. Kinetics of ionotropic receptor effects are fast

Ionotropic receptors are multiple-subunit structures, whereas metabotropic receptors are composed of single subunits only. Kinetics of ionotropic receptor effects are fast (<1 ms) whereas metabotropic receptors function over longer periods.

- 1027 In episodic ataxia, symptoms and episodic attacks of ataxia responsive to ?
Harrison's 18th Ed. 3342
- A. Lithium
 - B. Atypical antipsychotic drugs
 - C. Acetazolamide
 - D. Electroconvulsive therapy (ECT)

Symptoms & episodic attacks of episodic ataxia type 1 & 2 are responsive to acetazolamide (AZM) or or anticonvulsants.

- 1028 Episodic ataxia episodes are precipitated by ?
Harrison's 18th Ed. 3342
- A. Hunger
 - B. Exercise
 - C. Sleep
 - D. Meals

Episodes of ataxia in EA 1 & 2, with gait imbalance & slurring of speech, occur spontaneously or are precipitated by sudden movement, excitement, stress, exercise, or excessive fatigue.

- 1029 What was the nationality of Nicholas Friedreich, after whom Friedreich's ataxia has been named ?
- A. British
 - B. French

- C. German
- D. Spanish

Friedreich's ataxia is named after the German physician Nicholas Friedreich, who first described the condition in 1860s.

1030 Primary site of pathology in Friedreich's ataxia is ?

Harrison's 18th Ed. 3343

- A. Spinal cord
- B. Dorsal root ganglion cells
- C. Peripheral nerves
- D. All of the above

Primary pathology in Friedreich's ataxia is in spinal cord (sclerosis and degeneration in spinocerebellar tracts, lateral corticospinal tracts and posterior columns), dorsal root ganglion cells and peripheral nerves (loss of large myelinated fibers).

1031 Which of the following diseases is due to genetic abnormalities of DNA mismatch/repair ?

Harrison's 18th Ed. 488

- A. Bloom's syndrome
- B. Ataxia telangiectasia
- C. Hereditary nonpolyposis colon cancer (HNPCC)
- D. All of the above

Genetic abnormalities of DNA mismatch/repair include Fanconi anemia, xeroderma pigmentosum, Bloom's syndrome, ataxia telangiectasia, and hereditary nonpolyposis colon cancer (HNPCC). They strongly predispose to neoplasia because of the rapid acquisition of additional mutations

1032 Classic form of Friedreich's ataxia is mapped to chromosome ?

Harrison's 18th Ed. 3343

- A. 4
- B. 5
- C. 6
- D. 9

Friedreich's ataxia is an autosomal recessive congenital ataxia and is caused by a mutation in gene FXN (formerly known as X25) that codes for frataxin, located on chromosome 9q13-q21.1.

1033 Which of the following is a large-fiber sensory neuropathy ?

Harrison's 18th Ed. 3343

- A. Friedreich's ataxia
- B. Lepromatous leprosy
- C. Diabetes mellitus
- D. Antiretroviral therapy neuropathy

1034 Which of the following is a cause of pure sensory neuropathy ?

Harrison's 17th Ed. 2665

- A. Pyridoxine toxicity
- B. Friedreich's ataxia
- C. Cisplatin neuropathy
- D. All of the above

Causes of pure sensory neuropathy include Friedreich's ataxia, idiopathic sensory neuropathy, sensory neuropathy associated with Sjögren syndrome, vitamin B₁₂ neuropathy, pyridoxine toxicity & cisplatin neuropathy.

1035 Painful sensory neuropathy is an early feature of ?

Harrison's 17th Ed. 2665

- A. Lepromatous leprosy
- B. Diabetic small-fiber neuropathy
- C. Amyloidosis

- D. All of the above

A painful sensory neuropathy is an early feature of hereditary sensory neuropathies, lepromatous leprosy, diabetic small-fiber neuropathy, amyloidosis, Tangier Disease (TD), Fabry's disease & dysautonomia.

1036 Which of the following is a cause of pure motor neuropathy ?

Harrison's 17th Ed. 2665

- A. GBS
- B. Acute intermittent porphyria
- C. Diphtheria
- D. All of the above

Causes of predominantly motor neuropathies include GBS, CIDP, multifocal motor neuropathy (MMN), brachial neuropathy, diabetic lumbosacral radiculoplexus neuropathy (diabetic amyotrophy), neuropathy due to spinal muscular atrophy, acute intermittent porphyria, diphtheria, lead & dapsone.

1037 Mutant gene in classic form of Friedreich's ataxia is ?

Harrison's 18th Ed. 3343

- A. Frataxin
- B. Ataxin 1
- C. Ataxin 2
- D. All of the above

The classic form of Friedreich's ataxia is mapped to 9q13-q21.1. Mutant gene frataxin contains expanded GAA triplet repeats in the first intron. Because the defect is located on an intron (which is removed from the mRNA transcript between transcription and translation), this mutation does not result in the production of abnormal frataxin proteins. Instead, the mutation causes gene silencing (i.e., the mutation decreases the transcription of the gene) through induction of a heterochromatin structure. In Friedreich's ataxia, patients have 200 - 900 GAA repeats (normal 7 - 22). Altered protein is called frataxin.

1038 Which of the following about Friedreich's ataxia is false ?

Harrison's 18th Ed. 3343

- A. Frataxin is a mitochondrial protein for iron homeostasis
- B. Excess oxidized intramitochondrial iron
- C. Iron chelators and antioxidants are potentially harmful
- D. None of the above

Frataxin mRNA and frataxin protein are low in Friedreich's ataxia. Frataxin is a mitochondrial protein involved in iron homeostasis. Mitochondrial iron accumulation due to loss of the iron transporter coded by the mutant frataxin gene results in oxidized intramitochondrial iron resulting in oxidation of cellular components & irreversible cell injury. Iron chelators and antioxidants are potentially harmful.

1039 Which of the following about Friedreich's ataxia is false ?

Harrison's 18th Ed. 3343

- A. Presents before 25 years of age
- B. Lower extremities more severely involved than upper
- C. Flexor plantar responses
- D. Absence of deep tendon reflexes

Friedreich's ataxia presents before 25 years of age. Lower extremities are more severely involved than upper. Extensor plantar responses (with normal tone in trunk & extremities), absence of deep tendon reflexes are found. Loss of vibratory & proprioceptive sensation occurs.

1040 Which of the following about Friedreich's ataxia is false ?

Harrison's 18th Ed. 3343

- A. Cardiac involvement occurs in 90% of patients
- B. High incidence of diabetes mellitus
- C. Severe mental retardation
- D. Musculoskeletal deformities are common

Cardiomegaly, symmetric hypertrophy, murmurs & conduction defects reported in ~90% of patients. Diabetes mellitus is found in 20%. Pes cavus, pes equinovarus and progressive scoliosis common. Mental retardation is uncommon.

- 1041 Which of the following MRI finding is typical of Friedreich's ataxia ?**
Harrison's 18th Ed. 3343
- A. Brainstem atrophy
 - B. Cerebellar SOL
 - C. Spinal cord atrophy
 - D. Obstructive hydrocephalus

Neuroimaging reveals thinning of the cervical spinal cord.

- 1042 Which of the following drugs is of use in Friedreich's ataxia ?**
- A. Desferrioxamine
 - B. Idebenone
 - C. Ascorbic acid
 - D. All of the above

Idebenone, a short-chain analogue of coenzyme Q10 when used at an early stage reduces progression of cerebellar manifestation.

- 1043 Which of the following is a feature of Bassen-Kornzweig syndrome ?**
Harrison's 18th Ed. 3343
- A. Diabetes mellitus
 - B. Cardiomyopathy
 - C. Abetalipoproteinemia
 - D. Hypothyroidism

Bassen-Kornzweig syndrome is an autosomal recessive disorder in which a person is unable to fully absorb dietary fats through intestines. It is caused by a defect in microsomal triglyceride transfer protein (MTP) gene. Defects in MTP result in impairment of formation and secretion of VLDL in liver (abetalipoproteinemia). This defect results in a deficiency of delivery of vitamin E to tissues, including the central & peripheral nervous system, as VLDL is the transport molecule for vitamin E.

- 1044 Which of the following is false regarding ataxia with vitamin E deficiency (AVED) ?**
Harrison's 18th Ed. 3343
- A. Due to mutations in gene for α tocopherol transfer protein
 - B. Autosomal recessive
 - C. Chromosomal localization is on 8q13
 - D. None of the above

AVED is due to mutations in the gene for alpha-tocopherol transfer protein (α TTP). These patients have an impaired ability to bind vitamin E into the VLDL produced and secreted by the liver, resulting in a deficiency of vitamin E in peripheral tissues.

- 1045 Ataxia Telangiectasia is also known as ?**
- A. Louis-Bar syndrome
 - B. Nijmegen breakage syndrome (NBS1)
 - C. Lou Gehrig's disease
 - D. Pott's disease

Other names for ataxia-telangiectasia are A-T, Ataxia Telangiectasia Syndrome, ATM, Louis-Bar syndrome, Telangiectasia, cerebello-oculocutaneous.

- 1046 Gene responsible for Ataxia Telangiectasia is found on which chromosome ?**
Harrison's 18th Ed. 669 Table 83-3
- A. Chromosome 11
 - B. Chromosome 12
 - C. Chromosome 13
 - D. Chromosome 14

Ataxia Telangiectasia is inherited as an autosomal recessive disorder and offending gene is found on the long arm of chromosome 11 at 11q22-23. It controls the production of a phosphatidylinositol-3-kinase-like enzyme involved in cellular responses to stress, DNA damage and cell cycle control.

- 1047 Full name of ATM - the gene for Ataxia Telangiectasia is ?**
Harrison's 18th Ed. 496
- A. Ataxia-telangiectasia mutated
 - B. Ataxia-telangiectasia manifested
 - C. Ataxia-telangiectasia morphed
 - D. Ataxia-telangiectasia magnified

Ataxia-telangiectasia gene - ATM is on chromosome 11 and ATM stands for ataxia-telangiectasia mutated. ATM encodes a protein that is predominantly confined to nucleus of cells and that remains constant throughout all stages of the cell cycle and participate in cell's responses to genomic damage. ATM gene is homologous to genes involved in DNA repair & control of cell cycle checkpoints. Mutations in the ATM gene give rise to defects in meiosis as well as increasing susceptibility to damage from ionizing radiation.

- 1048 Mutation of which of the following gene causes a variant of AT (AT-like disease) ?**
Harrison's 18th Ed. Chapter e39
- A. SBDS
 - B. MRE11
 - C. CHD7
 - D. STAT5b

A variant of AT (AT-like disease) is caused by mutation of the MRE11 gene.

- 1049 AT causes which of the following ?**
Harrison's 18th Ed. Chapter e39
- A. Low IgA
 - B. IgG2 deficiency
 - C. Low antibody production
 - D. All of the above

AT causes a B cell immunodeficiency (low IgA, IgG2 deficiency, and low antibody production) that often requires immunoglobulin replacement therapy. Also, AT is associated with a progressive T cell immunodeficiency.

- 1050 Which of the following is false about Ataxia Telangiectasia ?**
Harrison's 17th Ed. 2571
- A. Present in first decade of life
 - B. Progressive telangiectatic lesions with deficits in cerebellar function & nystagmus
 - C. High incidence of recurrent pulmonary infections and neoplasms of lymphatic and reticuloendothelial system
 - D. None of the above

- 1051 In Ataxia Telangiectasia (AT), the most consistent defect of the lymphoid system is ?**
Harrison's 17th Ed. 2571
- A. Poorly developed or absent thymus gland
 - B. Generalised lymphadenopathy
 - C. Splenomegaly
 - D. Lymphedema

Poorly developed or absent thymus gland is the most consistent defect of the lymphoid system.

- 1052 Telangiectasia in Ataxia Telangiectasia usually occur on ?**
- A. Bulbar conjunctiva
 - B. Nail bed
 - C. Intracranial
 - D. All of the above

Telangiectasia in AT usually occur on the white portion of eye (bulbar conjunctiva) but may also be found on the ears, neck and extremities.

1053 Which of the following laboratory tests is useful in the diagnosis of Ataxia Telangiectasia ?

- A. Cryofibrinogen
- B. Ceruloplasmin level in blood
- C. Alpha-fetoprotein level in blood
- D. Apolipoprotein A-1

Alpha-fetoprotein levels in the blood are elevated (> 10 ng/ml) in >95% of patients of AT. AFP is produced only during fetal development.

1054 Which of the following statements about Ataxia-telangiectasia is false ?

Harrison's 17th Ed. 2571

- A. Affected child has normal intelligence
- B. Hypersensitivity to ionizing radiation
- C. Predisposition to malignancy
- D. None of the above

AT causes large telangiectatic lesions of face, cerebellar ataxia, immunologic defects & hypersensitivity to ionizing radiation. Affected child has normal or above normal intelligence. Insulin-resistant diabetes mellitus associated with anti-insulin antibodies occurs in patients with ataxia-telangiectasia.

1055 Hereditary forms of mitochondrial cytopathies include ?

Harrison's 17th Ed. 2571

- A. Kearns-Sayre syndrome
- B. Myoclonus epilepsy with ragged red fibers (MERRF)
- C. Mitochondrial encephalopathy with lactic acidosis and stroke-like episodes (MELAS)
- D. All of the above

Since mtDNA is transmitted exclusively by the mother, mitochondrial cytopathies show maternal inheritance and can be excluded when paternal transmission of the disease occurs in the family.

374 - Amyotrophic Lateral Sclerosis and Other Motor Neuron Diseases

1056 Lou Gehrig's disease is the other name of ?

N Engl J Med 2001;344:1688

- A. Amyotrophic lateral sclerosis
- B. Myasthenia gravis
- C. Multiple sclerosis
- D. Subacute combined degeneration of cord

ALS is often called Lou Gehrig's disease after Lou Gehrig (1903-1941), a hall-of-fame baseball player for New York Yankees who suffered with ALS. People in England and Australia call ALS as Motor Neurone Disease (MND). The French refer to it as Maladie de Charcot, after the French doctor Jean-Martin Charcot, who first wrote about ALS in 1869.

1057 Acute sporadic motor neuron diseases include ?

Harrison's 18th Ed. 3347 Table 374-2

- A. Poliomyelitis
- B. Herpes zoster
- C. Coxsackie virus
- D. All of the above

Acute sporadic motor neuron diseases include Poliomyelitis, Herpes zoster and Coxsackie virus.

1058 Chronic sporadic motor neuron disease with predominant involvement of upper motor neurons is ?

Harrison's 18th Ed. 3347 Table 374-2

- A. Amyotrophic lateral sclerosis
- B. Multifocal motor neuropathy with conduction block
- C. Motor neuropathy with paraproteinemia
- D. Primary lateral sclerosis

Chronic sporadic MND with predominant involvement of UMN is primary lateral sclerosis.

1059 Chronic sporadic motor neuron disease with predominant involvement of lower motor neurons are ?

Harrison's 18th Ed. 3347 Table 374-2

- A. Multifocal motor neuropathy with conduction block
- B. Motor neuropathy with paraproteinemia or cancer
- C. Motor-predominant peripheral neuropathies
- D. All of the above

In Amyotrophic lateral sclerosis, both upper & lower motor neurons are involved. In Primary lateral sclerosis, predominantly upper motor neurons are involved. In Multifocal motor neuropathy with conduction block, Motor neuropathy with paraproteinemia or cancer and Motor-predominant peripheral neuropathies, predominantly lower motor neurons are affected.

1060 Diseases that affect only upper motor neurons innervating the brainstem and spinal cord are ?

Harrison's 18th Ed. 3345

- A. Pseudobulbar palsy
- B. Primary lateral sclerosis (PLS)
- C. Familial spastic paraplegia (FSP)
- D. All of the above

Pseudobulbar palsy, primary lateral sclerosis (PLS), and familial spastic paraplegia (FSP) affect only upper motor neurons innervating the brainstem and spinal cord.

1061 In amyotrophic lateral sclerosis, the structures that are left intact include ?

Harrison's 18th Ed. 3345

- A. Sensory apparatus
- B. Centers for control & coordination of movement
- C. Centers for cognitive processes
- D. All of the above

A remarkable feature of ALS is the selectivity of neuronal cell death. Entire sensory apparatus, regulatory mechanisms for the control and coordination of movement and the components of brain that are needed for cognitive processes remain intact.

1062 In amyotrophic lateral sclerosis, the structures that are left intact include ?

Harrison's 18th Ed. 3345

- A. Motor neurons for ocular motility
- B. Parasympathetic neurons in sacral spinal cord
- C. Sensory apparatus
- D. All of the above

In ALS, within motor system, there is selectivity of involvement. Motor neurons required for ocular motility remain unaffected, as do the parasympathetic neurons in the sacral spinal cord (the nucleus of Onufrowicz, or Onuf) that innervate the sphincters of the bowel and bladder.

1063 In ALS, the cause leading to death is ?

Harrison's 18th Ed. 3346

- A. Infections
- B. Depression and suicide
- C. Respiratory paralysis
- D. Cardiovascular event

In ALS, the cause leading to death is respiratory paralysis.

1064 Which of the following is not a feature of ALS ?*Harrison's 18th Ed. 3346*

- A. Absence of pain or of sensory changes
- B. Normal bowel and bladder function
- C. Normal roentgenographic studies of spine
- D. Raised proteins in cerebrospinal fluid (CSF)

Absence of pain or of sensory changes, normal bowel and bladder function, normal roentgenographic studies of the spine, and normal cerebrospinal fluid (CSF) all favor ALS.

1065 Which of the following antibiotics has neuroprotective properties ?*N Engl J Med 2003;348:1365-75*

- A. Azithromycin
- B. Minocycline
- C. Spiramycin
- D. Vancomycin

Minocycline is a second-generation tetracycline with neuroprotective properties. Minocycline inhibits ischemia-induced up-regulation of nitric oxide synthase, caspase 1, and reactive microgliosis. Neuroprotection by minocycline has been observed in Huntington's disease, ALS, brain injury, Parkinson's disease, and multiple sclerosis.

1066 Multifocal motor neuropathy with conduction block (MMCB) evolves in association with which of the following ?*Harrison's 18th Ed. 3347*

- A. Tuberculosis
- B. Lymphoma
- C. Syphilis
- D. All of the above

MMCB is a diffuse, lower motor axonal neuropathy mimicking ALS which sometimes evolves in association with lymphoma or multiple myeloma.

1067 Intraneuronal inclusions "Bunina bodies" are a pathognomonic feature of ?*N Engl J Med 2001;344:1688*

- A. Motor neuron disease
- B. Multiple sclerosis
- C. Subacute combined degeneration of cord
- D. Myasthenia gravis

1068 Differential diagnosis of amyotrophic lateral sclerosis is ?*Harrison's 18th Ed. 3347*

- A. Compression of cervical spinal cord
- B. Thyrotoxicosis
- C. Chronic lead poisoning
- D. All of the above

D/D of ALS includes cervical spinal cord compression, cervicomedullary junction tumors, cervical or foramen magnum tumors, cervical spondylosis, chronic lead poisoning, thyrotoxicosis, hexosaminidase A, or alpha-glucosidase deficiency.

1069 Riluzole - a glutamate antagonist is useful in treatment of ?*Harrison's 18th Ed. 3349*

- A. Amyotrophic lateral sclerosis
- B. Multiple sclerosis
- C. Subacute combined degeneration of cord
- D. Myasthenia gravis

Riluzole is approved for ALS. Riluzole reduces excitotoxicity by diminishing glutamate release.

1070 Which of the following is false for Kennedy's Disease ?*Harrison's 18th Ed. 3350*

- A. X linked spinobulbar muscular atrophy
- B. Lower motor neuron disorder
- C. Gynecomastia and reduced fertility
- D. None of the above

Azoospermia & male-factor infertility occurs in association with mild loss of function mutations in androgen receptor. Trinucleotide (CAG) repeat expansion, from a mean of 22 repeats to greater than 40 repeats, within a highly polymorphic region of androgen receptor is associated with spinal & bulbar muscular atrophy (Kennedy disease). These patients may show evidence of partial androgen insensitivity in adolescence or adulthood (gynecomastia).

1071 Werdnig-Hoffmann Disease is the name given to ?*Harrison's 18th Ed. 3350*

- A. SMA I
- B. SMA II
- C. SMA III
- D. None of the above

1072 Kugelberg-Welander disease is the name given to ?*Harrison's 18th Ed. 3350*

- A. SMA I
- B. SMA II
- C. SMA III
- D. None of the above

1073 Which out of the following carries the worst prognosis ?*Harrison's 18th Ed. 3350*

- A. SMA I
- B. SMA II
- C. SMA III
- D. None of the above

Infantile SMA or SMA I is known as Werdnig-Hoffmann disease with earliest onset & most rapidly fatal course. Chronic childhood SMA (SMA II) begins later in childhood & evolves with slowly progressive course. Juvenile SMA (SMA III or Kugelberg-Welander disease) manifests in late childhood & has a slow course. EP studies distinguish SMA III from myopathic syndromes.

1074 Which of the following is false about spinal muscular atrophy ?*Harrison's 18th Ed. 3350*

- A. Genetic lower motor neuron disease
- B. Early onset
- C. Locus on chromosome 5
- D. None of the above

1075 Which of the following is false about spinal muscular atrophy ?*Harrison's 18th Ed. 3350*

- A. Extensive loss of large motor neurons
- B. Evidence of denervation atrophy on muscle biopsy
- C. Electrophysiologic evidence of denervation
- D. None of the above

1076 Which of the following is false about 'Multifocal Motor Neuropathy with Conduction Block' (MMCB) ?*Harrison's 18th Ed. 3350*

- A. Elevated serum titers of mono- & polyclonal antibodies to ganglioside GM1

- B. No corticospinal tract signs
- C. Respond to intravenous immunoglobulin therapy
- D. None of the above

1077 Which of the following is true for Fazio-Londe syndrome ?

Harrison's 18th Ed. 3350

- A. ALS variant
- B. Juvenile onset
- C. Involves musculature innervated by brainstem mainly
- D. All of the above

Fazio-Londe syndrome is an ALS variant of juvenile onset that involves mainly the musculature innervated by the brainstem.

1078 Which of the following is false for Familial Spastic Paraplegia (FSP) in adults ?

Harrison's 18th Ed. 3350

- A. X linked transmission
- B. Presents in third or fourth decade
- C. Progressive spastic weakness in lower extremities
- D. Long survival

In its pure form, most adult-onset FSP are transmitted as an autosomal dominant trait. FSP has long survival because respiratory function is spared.

1079 Which of the following is false for Familial Spastic Paraplegia (FSP) ?

Harrison's 18th Ed. 3350

- A. Sexual function preserved
- B. Spastin and atlastin gene mutations common
- C. Degeneration of corticospinal tracts
- D. None of the above

In FSP, sexual function tends to be preserved. Gene implicated is spastin & atlastin in dominantly inherited and childhood-onset dominant FSP respectively. Degeneration of corticospinal tracts occurs in FSP, most severe at more caudal levels in spinal cord.

1080 Which of the following is a disorder of CNS myelin ?

Harrison's 18th Ed. 3350

- A. Fragile X syndrome
- B. Pelizaeus-Merzbacher syndrome
- C. Prader-Willi syndrome
- D. Rett syndrome

Pelizaeus-Merzbacher disease is a widespread disorder of CNS myelin.

1081 Protein restricted to CNS myelin is which of the following ?

Harrison's 16th Ed. 2341

- A. Proteolipid protein (PLP)
- B. P₀
- C. PMP22
- D. GM₁

1082 Protein restricted to PNS myelin is which of the following ?

Harrison's 16th Ed. 2341

- A. Proteolipid protein (PLP)
- B. P₀
- C. Myelin oligodendrocyte glycoprotein (MOG)
- D. GM₁

1083 Protein in both CNS & PNS myelin is ?

Harrison's 16th Ed. 2341

- A. Proteolipid protein (PLP)
- B. P₀
- C. Myelin oligodendrocyte glycoprotein (MOG)
- D. GM₁

375 - Disorders of the Autonomic Nervous System

1084 Connections between cerebral cortex and autonomic centers occurs in ?

Harrison's 18th Ed. 3351

- A. Cerebral cortex
- B. Brainstem
- C. Spinal cord
- D. All of the above

Connections between cerebral cortex & autonomic centers in brainstem coordinate autonomic outflow with higher mental functions.

1085 Preganglionic neurons of parasympathetic nervous system leave the central nervous system in all except ?

Harrison's 18th Ed. 3351

- A. Third cranial nerve
- B. Sixth cranial nerve
- C. Seventh cranial nerve
- D. Tenth cranial nerve

1086 Preganglionic neurons of parasympathetic nervous system leave the central nervous system in all except ?

Harrison's 18th Ed. 3351

- A. Tenth cranial nerve
- B. Eleventh cranial nerve
- C. Second sacral nerve
- D. Third sacral nerve

Preganglionic neurons of PNS leave CNS in third, seventh, ninth & tenth cranial nerves as well as the second & third sacral nerves.

1087 Preganglionic neurons of sympathetic nervous system exit the spinal cord between ?

Harrison's 18th Ed. 3351

- A. T1 and L1 segments
- B. T1 and L2 segments
- C. T1 and L3 segments
- D. T1 and L4 segments

Preganglionic neurons of sympathetic nervous system exit spinal cord between first thoracic and the second lumbar segments.

1088 Acetylcholine is the neurotransmitter for all except ?

Harrison's 18th Ed. 3351

- A. Preganglionic parasympathetic ANS
- B. Preganglionic sympathetic ANS
- C. Postganglionic parasympathetic ANS
- D. Postganglionic sympathetic ANS

1089 Norepinephrine (NE) is the neurotransmitter for ?

Harrison's 18th Ed. 3351

- A. Preganglionic parasympathetic ANS
- B. Preganglionic sympathetic ANS
- C. Postganglionic parasympathetic ANS
- D. Postganglionic sympathetic ANS

Acetylcholine (ACh) is the preganglionic neurotransmitter for both divisions of ANS as well as postganglionic neurotransmitter of parasympathetic neurons. Norepinephrine (NE) is the neurotransmitter of postganglionic sympathetic neurons, except for cholinergic neurons innervating eccrine sweat glands.

1090 With sympathetic activation, which of the following does not occur ?

Harrison's 18th Ed. 3352 Table 375-1

- A. Increased bowel motility
- B. Increased bladder sphincter tone
- C. Sweating
- D. Ejaculation, orgasm

1091 With parasympathetic activation, which of the following does not occur ?

Harrison's 18th Ed. 3352 Table 375-1

- A. Increased bowel motility
- B. Penile erection
- C. Tearing
- D. Sweating

1092 Which of the following is regulated by autonomic circuits ?

Harrison's 16th Ed. 2429

- A. Sleep
- B. Pupils
- C. Bowel & bladder function
- D. All of the above

1093 Which of the following statements about autonomic control of urinary bladder is false ?

Harrison's 18th Ed. 3352

- A. Upper motor neuron lesion leads to spastic bladder
- B. Lower motor neuron lesion leads to flaccid bladder
- C. Bladder volume is a useful test for distinguishing between UMN and LMN bladder dysfunction
- D. None of the above

Brain & spinal cord disease above lumbar level results in UMN or spastic bladder. PNS disease results in LMN flaccid bladder (large volumes, urinary frequency & overflow incontinence). Measurement of post-void residual bladder volume is useful test to distinguish between UMN & LMN bladder dysfunction.

1094 Drugs that can cause Orthostatic hypotension (OH) include all except ?

Harrison's 18th Ed. 3354

- A. Diuretics
- B. Phenothiazines
- C. Beta adrenergic blockers
- D. Calcium channel blockers

1095 Drugs that can cause Orthostatic hypotension (OH) include all except ?

Harrison's 18th Ed. 3354

- A. Insulin
- B. Glucagon
- C. Barbiturates
- D. Ethanol

Drugs that may cause OH are diuretics, antihypertensives, antidepressants, phenothiazines, ethanol, narcotics, insulin, dopamine agonists, barbiturates & calcium channel blocking agents.

1096 OH is defined as, within 3 minutes of standing up, a sustained drop in SBP and DBP of ?

Harrison's 17th Ed. 2578

- A. 20 and 20 mm Hg respectively
- B. 20 and 10 mm Hg respectively
- C. 10 and 10 mm Hg respectively
- D. 10 and 5 mm Hg respectively

OH is defined as a sustained drop in systolic (≥ 20 mmHg) or diastolic (≥ 10 mmHg) BP within three minutes of standing.

1097 Heart rate variation with deep breathing (respiratory sinus arrhythmia) is abolished by administration of ?

Harrison's 18th Ed. 3355

- A. Atropine
- B. Digoxin
- C. Beta blockers
- D. All of the above

HRDB or Heart rate variation with deep breathing (respiratory sinus arrhythmia) is abolished by atropine but is unaffected by sympathetic blockade (propranolol).

1098 In Valsalva maneuver, a constant expiratory pressure of how much is maintained for 15 seconds ?

Harrison's 18th Ed. 3355

- A. 10 mm Hg
- B. 20 mm Hg
- C. 30 mm Hg
- D. 40 mm Hg

Valsalva maneuver assesses the integrity of baroreflex control of heart rate (parasympathetic) & BP (adrenergic). With subject supine, a constant expiratory pressure of 40 mmHg is maintained for 15 seconds while measuring changes in heart rate and beat-to-beat BP.

1099 Fall in BP occurs in which phase of Valsalva maneuver ?

Harrison's 18th Ed. 3355

- A. Phase I
- B. Early phase II
- C. Late phase II
- D. All of the above

Out of four phases of Valsalva maneuver response, phases I & III are mechanical & related to changes in intrathoracic & intraabdominal pressure. In early phase II, reduced venous return results in a fall in stroke volume and BP, counteracted by a combination of reflex tachycardia and increased total peripheral resistance. Increased total peripheral resistance arrests the BP drop ~5 - 8 seconds after the onset of maneuver. Late phase II begins with a progressive rise in BP towards or above baseline. Venous return and cardiac output return to normal in phase IV. Persistent peripheral arteriolar vasoconstriction and increased cardiac adrenergic tone results in a temporary BP overshoot and phase IV bradycardia (mediated by baroreceptor reflex).

1100 The 'Valsalva ratio' is defined as ?

Harrison's 18th Ed. 3355

- A. Maximum phase 1 tachycardia divided by minimum phase 4 bradycardia
- B. Maximum phase 2 tachycardia divided by minimum phase 4 bradycardia

- C. Maximum phase 3 tachycardia divided by minimum phase 4 bradycardia
- D. Maximum phase 4 tachycardia divided by minimum phase 4 bradycardia

Autonomic function during the Valsalva maneuver can be measured using beat-to-beat blood pressure or heart rate changes. Valsalva ratio is defined as the maximum phase II tachycardia divided by minimum phase IV bradycardia. The ratio reflects cardiovagal function.

1101 Sweating is induced by release of acetylcholine from ?

Harrison's 18th Ed. 3355

- A. Preganglionic parasympathetic ANS
- B. Preganglionic sympathetic ANS
- C. Postganglionic parasympathetic ANS
- D. Postganglionic sympathetic ANS

Sweating is induced by release of acetylcholine (ACh) from sympathetic postganglionic fibers.

1102 Which of the following is a test for sweating ?

Harrison's 18th Ed. 3355

- A. Quantitative sudomotor axon reflex test (QSART)
- B. Thermoregulatory sweat test (TST)
- C. Measurement of galvanic skin responses
- D. All of the above

1103 A reduced or absent response in 'Quantitative sudomotor axon reflex test (QSART)' indicates ?

Harrison's 18th Ed. 3356

- A. Lesion of preganglionic sudomotor axon
- B. Lesion of postganglionic sudomotor axon
- C. Lesion of pre & postganglionic sudomotor axon
- D. None of the above

A reduced or absent response indicates a lesion of the postganglionic sudomotor axon.

1104 If both QSART and TST are absent, the lesion is in ?

Harrison's 18th Ed. 3356

- A. Preganglionic sudomotor axon
- B. Postganglionic sudomotor axon
- C. Pre & postganglionic sudomotor axon
- D. None of the above

A postganglionic lesion is present if both QSART and TST show absent sweating.

1105 If QSART is intact but TST shows anhidrosis, lesion is in ?

Harrison's 18th Ed. 3356

- A. Preganglionic sudomotor axon
- B. Postganglionic sudomotor axon
- C. Pre & postganglionic sudomotor axon
- D. None of the above

In a preganglionic lesion, QSART is intact but TST shows anhidrosis.

1106 Multiple system atrophy (MSA) comprises autonomic failure and which of the following ?

Harrison's 18th Ed. 3356

- A. Horner's syndrome
- B. Wernicke-Korsakoff syndrome
- C. Shy-Drager syndrome
- D. Shapiro's syndrome

Multiple system atrophy (MSA) comprises of autonomic failure (OH and/or a neurogenic bladder) combined with either striatonigral degeneration (Shy-Drager syndrome) or sporadic olivopontocerebellar atrophy.

1107 Parkinsonism seen in multiple system atrophy features which of the following ?

Harrison's 18th Ed. 3356

- A. No rest tremor
- B. Not responsive to levodopa
- C. Levodopa-induced dyskinesia uncommon
- D. All of the above

1108 Autonomic dysfunction is a common feature in ?

Harrison's 18th Ed. 3356

- A. Dementia with Lewy bodies (DLB)
- B. Multiple system atrophy (MSA)
- C. Parkinson's disease
- D. All of the above

Autonomic dysfunction is a feature in dementia with Lewy bodies, MSA & Parkinson's disease.

1109 Autonomic dysreflexia is common in patients with traumatic spinal cord lesion above which level ?

Harrison's 18th Ed. 3356

- A. C6
- B. T3
- C. T12
- D. L2

Markedly increased autonomic discharge or autonomic dysreflexia is common in patients with traumatic spinal cord lesion above the C6 level.

1110 Neuromuscular junction disorders accompanied by autonomic involvement include ?

Harrison's 18th Ed. 3356-57

- A. Porphyria
- B. Botulism
- C. Chronic alcoholism
- D. Guillain-Barré syndrome

Peripheral neuropathies as in diabetes mellitus, amyloidosis, chronic alcoholism, porphyria, and Guillain-Barré syndrome lead to chronic autonomic insufficiency. Neuromuscular junction disorders with autonomic involvement include botulism and Lambert-Eaton syndrome.

1111 Autonomic neuropathy typically begins how many years after the onset of diabetes mellitus ?

Harrison's 18th Ed. 3357

- A. ~ 5
- B. ~ 7
- C. ~ 10
- D. ~ 14

Autonomic neuropathy typically begins ~10 years after the onset of DM.

1112 Autoantibodies against which of the following is present in autoimmune autonomic neuropathy (AAN) ?

Harrison's 18th Ed. 3357

- A. A₃ AChR
- B. B₃ AChR
- C. C₃ AChR

D. D₃ AChR

Autoantibodies against ganglionic ACh receptor (A₃ AChR) are present in the serum of patients of autoimmune autonomic neuropathy (AAN).

1113 Botulinum toxin blocks release of which of the following ?

Harrison's 18th Ed. 3357

- A. Norepinephrine
- B. Acetylcholine
- C. Serotonin
- D. All of the above

Botulinum toxin binds presynaptically to cholinergic nerve terminals and after uptake into cytosol blocks ACh release.

1114 Which of the following statements about Pure Autonomic Failure (PAF) is false ?

Harrison's 18th Ed. 3357

- A. Involvement of postganglionic sympathetic neurons
- B. Low supine plasma NE levels
- C. Noradrenergic supersensitivity
- D. None of the above

In Pure Autonomic Failure (PAF) there is primary involvement of postganglionic sympathetic neurons that results in low supine plasma NE levels & noradrenergic supersensitivity.

1115 Which of the following is false about Postural Orthostatic Tachycardia Syndrome (POTS) ?

Harrison's 18th Ed. 3357

- A. Symptomatic orthostatic hypotension
- B. Increase in heart rate of > 30 beats/min with standing
- C. Women affected five times more often than men
- D. Occurs between 15 and 50 years of age

POTS is characterized by symptomatic orthostatic intolerance (not OH) and by either an increase in heart rate to >120 beats/minute or an increase of 30 beats/minute with standing that subsides on sitting or lying down. Women are affected approximately five times more often than men, and most develop the syndrome between the ages of 15 and 50.

1116 Hereditary sensory and autonomic neuropathy I (HSAN I) is best related to which of the following ?

Harrison's 18th Ed. 3358

- A. Dermatan sulfate
- B. Sphingomyelin
- C. Glucosyl ceramide
- D. Heparan sulfate

SPTLC is an enzyme in the regulation of ceramide. Cells from HSAN I patients affected by mutation of SPTLC1 gene produce higher-than-normal levels of glucosyl ceramide triggering apoptosis.

1117 The defective gene in HSAN III is ?

Harrison's 18th Ed. 3358

- A. IKBKAP
- B. SPTLC2
- C. SPTLC3
- D. SPTLC4

The defective gene in HSAN III is IKBKAP.

1118 Cause of autonomic storm is ?

Harrison's 18th Ed. 3358

- A. Brain and spinal cord injury
- B. Autonomic neuropathy

C. Pheochromocytoma

D. All of the above

Acute autonomic syndrome may be either acute autonomic failure (acute AAN syndrome) or a state of sympathetic overactivity. Autonomic storm is an acute state of sustained sympathetic surge. Causes are brain & spinal cord injury, toxins & drugs, autonomic neuropathy, and pheochromocytoma.

1119 Drug that can produce autonomic storm is ?

Harrison's 18th Ed. 3358

- A. Phenylpropanolamine
- B. Cocaine
- C. Amphetamine
- D. All of the above

Drugs and toxins that can produce autonomic storm include phenylpropanolamine, cocaine, amphetamine & tricyclic antidepressants, tetanus and botulinum.

1120 Neuroleptic malignant syndrome is seen in psychotic patients treated with ?

Harrison's 18th Ed. 3358

- A. Amphetamine
- B. Phenylpropanolamine
- C. Phenothiazine
- D. Any of the above

Neuroleptic malignant syndrome features muscle rigidity, hyperthermia & hypertension in psychotic patients treated with phenothiazines.

1121 Allodynia refers to ?

Harrison's 18th Ed. 3358

- A. Perception of nonpainful stimulus as painful
- B. Exaggerated pain response to a painful stimulus
- C. Spontaneous pain
- D. All of the above

Allodynia refers to the perception of a nonpainful stimulus as painful while hyperpathia refers to an exaggerated pain response to a painful stimulus.

1122 Which of the following must be present for the diagnosis of complex regional pain syndrome (CRPS) ?

Harrison's 18th Ed. 3359

- A. Vasomotor dysfunction
- B. Sudomotor abnormalities
- C. Focal edema
- D. Any of the above

Pain is the primary clinical feature of CRPS. Vasomotor dysfunction, sudomotor abnormalities, or focal edema may occur alone or in combination but must be present for diagnosis.

1123 CRPS type II develops after ?

Harrison's 18th Ed. 3359

- A. Injury to a specific peripheral nerve
- B. Myocardial infarction
- C. Stroke
- D. Limb injury

CRPS type I is a regional pain syndrome that usually develops after tissue trauma (myocardial infarction, minor shoulder or limb injury, stroke). CRPS type II is a regional pain syndrome that develops after injury to a specific peripheral nerve, usually a major nerve trunk.

376 - Cranial Nerve Disorders

1124 Motor part of trigeminal (fifth cranial) nerve innervates which of the following muscle ?

Harrison's 18th Ed. 3360

- A. Orbicularis oculi
- B. Posterior auricular
- C. Pterygoid
- D. Sternocleidomastoid

The trigeminal (fifth cranial) nerve supplies sensation to the skin of face and anterior half of the head. Its motor part innervates the masseter & pterygoid masticatory muscles.

1125 Trigeminal neuralgia is rare in which distribution of fifth nerve ?

Harrison's 18th Ed. 3360

- A. Ophthalmic division
- B. Maxillary division
- C. Mandibular division
- D. None of the above

Trigeminal neuralgia is characterized by excruciating paroxysms of pain in lips, gums, cheek, or chin and, very rarely, in the distribution of the ophthalmic division of the fifth nerve.

1126 In trigeminal neuralgia, pain lasts for about ?

Harrison's 18th Ed. 3360

- A. Few seconds to a minute or two
- B. Five to ten minutes
- C. Half an hour to six hours
- D. Twenty four to forty eight hours

In trigeminal neuralgia, pain seldom lasts more than a few seconds or a minute or two. Onset is typically sudden, and bouts tend to persist for weeks or months before remitting spontaneously. Remissions may be long-lasting, but in most patients the disorder ultimately recurs.

1127 In trigeminal neuralgia, trigger zones are least frequent in ?

Harrison's 18th Ed. 3360

- A. Face
- B. Forehead
- C. Lips
- D. Tongue

Characteristic feature of Trigeminal neuralgia is the presence of trigger zones, typically on the face, lips, or tongue.

1128 In trigeminal neuralgia, objective signs of sensory loss are found in ?

Harrison's 18th Ed. 3360

- A. Ophthalmic division
- B. Maxillary division
- C. Mandibular division
- D. None of the above

An essential feature of trigeminal neuralgia is that objective signs of sensory loss cannot be demonstrated on examination.

1129 Which of the following artery causes compression of the trigeminal nerve root to cause trigeminal neuralgia ?

Harrison's 18th Ed. 3360

- A. Superior cerebellar artery
- B. Inferior cerebellar artery

- C. Anterior choroidal artery
- D. Posterior cerebral artery

Compression of trigeminal nerve root by superior cerebellar artery or a tortuous vein causes trigeminal neuralgia.

1130 Which of the following is characteristic of pain of trigeminal neuralgia ?

Harrison's 18th Ed. 3360

- A. Superficial stabbing quality
- B. Paroxysmal & lancinating
- C. Occurs both day and night
- D. All of the above

1131 When cluster headache is associated with trigeminal neuralgia, the syndrome is known as ?

Harrison's 18th Ed. 3361

- A. Glossopharyngeal neuralgia
- B. Tic Douloureux
- C. Cluster-tic
- D. PH-tic syndrome

When cluster headache is associated with trigeminal neuralgia, syndrome is known as cluster-tic.

1132 Which of the following point towards trigeminal neuralgia being related to multiple sclerosis ?

Harrison's 18th Ed. 3361

- A. Onset before age 50 years
- B. Bilateral symptoms
- C. Objective sensory loss
- D. All of the above

Most cases of trigeminal neuralgia are not MS-related. Atypical features such as onset before age 50 years, bilateral symptoms, objective sensory loss, or nonparoxysmal pain should raise concerns that MS could be responsible.

1133 Which of the following drugs are used in cases of trigeminal neuralgia ?

Harrison's 18th Ed. 3361

- A. Carbamazepine
- B. Phenytoin
- C. Baclofen
- D. All of the above

Drug therapy for trigeminal neuralgia include carbamazepine, oxcarbazepine, lamotrigine, phenytoin and baclofen.

1134 Which of the following is the most widely used procedure in treating trigeminal neuralgia ?

Harrison's 17th Ed. 2583

- A. Radiofrequency thermal rhizotomy
- B. Injection of glycerol in Meckel's cave
- C. Microvascular decompression
- D. Gamma knife radiosurgery

1135 Gasserian ganglion lesions causing trigeminal nerve disorders include all except ?

Harrison's 18th Ed. 3361 Table 376-1

- A. Trigeminal neuroma
- B. Herpes zoster

- C. Sarcoidosis
- D. Infection

1136 Peripheral trigeminal nerve lesion can be due to ?

Harrison's 18th Ed. 3361 Table 376-1

- A. Guillain-Barré syndrome
- B. Sjögren's syndrome
- C. Collagen-vascular diseases
- D. All of the above

1137 Which of the following can cause trismus ?

Harrison's 18th Ed. 3361

- A. Ludwig's angina
- B. Phenothiazine
- C. Tetanus
- D. All of the above

1138 In Bell's palsy, maximal weakness being attained by ?

Harrison's 17th Ed. 2584

- A. 6 hours
- B. 12 hours
- C. 24 hours
- D. 48 hours

The onset of Bell's palsy is abrupt and maximal weakness occurs by 48 hours as a general rule.

1139 Which of the following statements about causation of Bell's palsy is false ?

N Engl J Med 2004;351:1323-31

- A. HSV-1 is the cause of most cases of Bell's palsy
- B. HSV-1 DNA appear to be specific to Bell's palsy
- C. Disease probably reflects virus reactivation from latency in geniculate ganglion, rather than primary infection
- D. None of the above

1140 Which of the following may be caused by multiple sclerosis or follow Guillain-Barré syndrome ?

Harrison's 17th Ed. 2586

- A. Blepharospasm
- B. Facial myokymia
- C. Hemifacial spasm
- D. Facial hemiatrophy

Facial myokymia may be caused by MS or follow GBS.

1141 Poor prognostic factors in a case of Bell's palsy are all except ?

N Engl J Med 2004;351:1323-31

- A. Older age
- B. Hypertension
- C. Diabetes mellitus
- D. Impairment of taste

1142 Poor prognostic factors in a case of Bell's palsy are all except ?

N Engl J Med 2004;351:1323-31

- A. Hypertension
- B. Pain other than in the ear
- C. Anemia
- D. Complete facial weakness

1143 For how many days, electrical studies reveal no changes in involved facial muscles in Bell's palsy ?

N Engl J Med 2004;351:1323-31

- A. 1 day
- B. 2 days
- C. 3 days
- D. 4 days

1144 Causes of acquired peripheral facial weakness include all except ?

N Engl J Med 2004;351:1323-31

- A. Diabetes mellitus
- B. Hypothyroidism
- C. Hypertension
- D. HIV infection

1145 Causes of acquired peripheral facial weakness include all except ?

N Engl J Med 2004;351:1323-31

- A. Lyme disease
- B. Ramsay Hunt syndrome
- C. Sarcoidosis
- D. Rheumatoid arthritis

1146 Causes of acquired peripheral facial weakness include all except ?

N Engl J Med 2004;351:1323-31

- A. Sjögren's syndrome
- B. Parotid-nerve tumors
- C. Eclampsia
- D. Dental trauma

1147 Causes of acquired peripheral facial weakness include ?

N Engl J Med 2004;351:1323-31

- A. Amyloidosis
- B. Recipients of inactivated intranasal influenza vaccine
- C. Eclampsia
- D. All of the above

1148 Recurrent or bilateral facial palsy is found in all except ?

N Engl J Med 2004;351:1323-31

- A. Myasthenia gravis
- B. Lesions at base of brain
- C. Guillain Barré syndrome
- D. Ramsay Hunt syndrome in immunocompetent people

1149 Recurrent or bilateral facial palsy is found in ?

N Engl J Med 2004;351:1323-31

- A. Lymphoma
- B. Sarcoidosis
- C. Lyme disease
- D. All of the above

1150 Which of the following statements about central weakness of the unilateral lower facial area is false ?

N Engl J Med 2004;351:1323-31

- A. Lesion above level of contralateral facial nucleus
- B. Facial nucleus innervating lower face receives fibers from ipsilateral cerebral hemisphere

- C. Facial nucleus innervating upper face receives fibers from both cerebral hemispheres
D. Unilateral lesion in cortex produces contralateral voluntary central-type facial paralysis and contralateral hemiplegia
- 1151 Which of the following about facial palsy is false ?**
N Engl J Med 2004;351:1323-31
A. Hyperacusis results from paralysis of stapedius muscle
B. Lesions proximal to geniculate ganglion have permanent loss of taste and are unable to produce tears
C. Aberrant regeneration of nerve fibres is the cause of syndrome of crocodile tears
D. None of the above
- 1152 Which of the following about facial nerve is false ?**
N Engl J Med 2004;351:1323-31
A. Facial nerve is predominantly motor
B. Facial nucleus is located in caudal pons
C. Facial nerve encircles nucleus of sixth cranial nerve
D. Facial nerve exits in midpons
- 1153 Which of the following about facial nerve is false ?**
N Engl J Med 2004;351:1323-31
A. 8th nerve, motor root of 7th nerve, and nervus intermedius enter internal auditory meatus
B. Sensory cells located in geniculate ganglion continue distally as chorda tympani nerve
C. Peripheral fibers of nervus intermedius portion of facial nerve initiate salivary, lacrimal, and mucous secretion
D. None of the above
- 1154 Locate the lesion if there is contralateral central facial weakness, lacrimation, salivation, and taste are intact, contralateral hemiparesis and spasticity ?**
N Engl J Med 2004;351:1323-31
A. Cortex, subcortical region
B. Pons
C. Cerebellopontine angle
D. All of the above
- 1155 Locate the lesion if there is ipsilateral peripheral facial weakness; lacrimation, salivation, and taste intact; contralateral hemiparesis, sensory loss, ataxia, nystagmus, ipsilateral abducens palsy, ophthalmoparesis ?**
N Engl J Med 2004;351:1323-31
A. Cortex, subcortical region
B. Pons
C. Cerebellopontine angle
D. All of the above
- 1156 Locate the lesion if there is ipsilateral peripheral facial weakness; lacrimation, salivation, and taste intact; tinnitus, facial numbness, ataxia, nystagmus ?**
N Engl J Med 2004;351:1323-31
A. Cortex, subcortical region
B. Pons
C. Cerebellopontine angle
D. All of the above
- 1157 Locate the lesion if there is ipsilateral peripheral facial weakness; lacrimation, salivation, and taste likely to be involved; tinnitus, nystagmus, hearing loss ?**
N Engl J Med 2004;351:1323-31
A. Cortex, subcortical region
B. Pons
C. Cerebellopontine angle
D. Facial nerve in internal auditory canal proximal to or involving geniculate ganglion
- 1158 Locate the lesion if there is ipsilateral peripheral facial weakness; lacrimation intact but salivation and taste impaired; tinnitus, nystagmus, hearing loss ?**
N Engl J Med 2004;351:1323-31
A. Pons
B. Facial nerve in stylomastoid foramen
C. Facial nerve in internal auditory canal proximal to or involving geniculate ganglion
D. Facial nerve distal to internal auditory canal and geniculate ganglion
- 1159 Locate the lesion if there is ipsilateral peripheral facial weakness; lacrimation, salivation, and taste intact ?**
N Engl J Med 2004;351:1323-31
A. Cerebellopontine angle
B. Facial nerve in internal auditory canal proximal to or involving geniculate ganglion
C. Facial nerve distal to internal auditory canal & geniculate ganglion
D. Facial nerve in stylomastoid foramen
- 1160 House Brackmann grading system is used for assessing ?**
N Engl J Med 2004;351:1323-31
A. Facial muscle function
B. Parotid function
C. Hearing function
D. Salivary function
- 1161 Facial nerve is compressed at its narrowest point, which is ?**
N Engl J Med 2004;351:1323-31
A. Entrance to meatal foramen
B. Middle of internal auditory canal
C. Exit point of internal auditory canal
D. Exit point of facial nerve from pons
- 1162 Decompression surgery should not be performed ?**
N Engl J Med 2004;351:1323-31
A. 7 days after the onset of paralysis
B. 14 days after the onset of paralysis
C. 21 days after the onset of paralysis
D. 28 days after the onset of paralysis
- 1163 The Melkersson-Rosenthal syndrome consists of ?**
Harrison's 18th Ed. 3363
A. Recurrent facial paralysis

- B. Facial (labial) edema
- C. Plication of tongue
- D. All of the above

Melkersson-Rosenthal syndrome consists of recurrent facial paralysis, recurrent and eventually permanent facial (labial) edema and less constantly, plication of tongue of unknown cause.

1164 Which of the following is false about Glossopharyngeal Neuralgia ?

Harrison's 18th Ed. 3364

- A. Involves IX & portions of X cranial nerves
- B. Pain may radiate from throat to ear
- C. Spasms of pain may be initiated by coughing
- D. None of the above

Glossopharyngeal neuralgia though uncommon resembles trigeminal neuralgia & involves IX & sometimes portions of vagus cranial nerves. Pain is intense & paroxysmal, originates on one side of throat (tonsillar fossa) and may radiate to the ear (tympanic branch of IX). Spasms of pain may be initiated by swallowing or coughing. There is no motor or sensory deficit

1165 Which of the following cranial nerves is not involved in pontocerebellar angle syndrome ?

Harrison's 18th Ed. 3364 Table 376-2

- A. V
- B. VII
- C. VIII
- D. XII

1166 Which of the following cranial nerves is not involved in jugular foramen syndrome ?

Harrison's 18th Ed. 3364 Table 376-2

- A. IX
- B. X
- C. XI
- D. XII

1167 Multiple cranial neuropathy can be caused by ?

Harrison's 18th Ed. 3365

- A. Wegener's granulomatosis
- B. Behcet's disease
- C. Sarcoidosis
- D. All of the above

1168 Multiple cranial neuropathy can be caused by ?

Harrison's 18th Ed. 3365

- A. Diabetes mellitus
- B. Meningitis
- C. Enlarging saccular aneurysms
- D. All of the above

1169 Which of the following is true for Tolosa-Hunt syndrome ?

Harrison's 18th Ed. 3365

- A. Aneurysm of carotid artery
- B. Carotid-cavernous fistula
- C. Idiopathic granulomatous disorder
- D. Meningioma

Tolosa-Hunt syndrome is an idiopathic granulomatous disorder that responds to glucocorticoids.

1170 About how many rods are present in human retina ?

Harrison's 18th Ed. 224

- A. 10 million
- B. 50 million
- C. 75 million
- D. 100 million

1171 About how many cones are present in human retina ?

Harrison's 18th Ed. 224

- A. 1 million
- B. 3 million
- C. 5 million
- D. 10 million

1172 Which of the following statements about vision is false ?

Harrison's 18th Ed. 224

- A. Rods operate in dim illumination
- B. Cones function under daylight conditions
- C. Rods specialized for color perception
- D. Fovea is packed exclusively with cones

1173 How many fibers are present in each optic nerve ?

Harrison's 18th Ed. 224

- A. 1 million
- B. 2 million
- C. 3 million
- D. 4 million

1174 Each eye is moved by how many extraocular muscles ?

Harrison's 18th Ed. 224

- A. 4
- B. 5
- C. 6
- D. 8

1175 Which of the following feature of Horner's syndrome is inconstant ?

Harrison's 18th Ed. 225

- A. Miosis
- B. Ipsilateral ptosis
- C. Anhidrosis
- D. All of the above

1176 Which of the following is false regarding Adie's syndrome ?

Harrison's 18th Ed. 225

- A. Tonic pupil
- B. Weak or absent tendon reflexes in lower extremities
- C. Benign disorder in healthy young women
- D. None of the above

1177 Tonic pupils is associated with ?

Harrison's 18th Ed. 225

- A. Shy-Drager syndrome
- B. Diabetes mellitus
- C. Amyloidosis
- D. All of the above

1178 In retina, which of the following is not a class of cones ?

Harrison's 18th Ed. 226

- A. Red
- B. Green
- C. Yellow
- D. Blue

1179 Which of the following is false about colour vision ?

Harrison's 18th Ed. 226

- A. Red & green cone pigments are encoded on X chromosome
- B. Blue cone pigment is encoded on chromosome 7
- C. Mutations of blue cone pigment are common
- D. Ishihara color plates is used to detect red-green color blindness

1180 Marcus Gunn pupil indicates ?

Harrison's 18th Ed. 225

- A. Retrobulbar optic neuritis
- B. Herpes zoster infection
- C. Diabetes mellitus
- D. All of the above

An eye with no light perception has no pupillary response to direct light stimulation. If the retina or optic nerve is only partially injured, direct pupillary response will be weaker than consensual pupillary response evoked by shining a light into other eye. This relative afferent pupillary defect (Marcus Gunn pupil) can be elicited with the swinging flashlight test. It is an extremely useful sign in retrobulbar optic neuritis & optic nerve diseases.

1181 Which of the following is false regarding 'Papilledema' ?

Harrison's 18th Ed. 232

- A. Bilateral optic disc swelling
- B. Due to raised intracranial pressure
- C. Transient visual obscuration
- D. Visual acuity is generally affected by papilledema

1182 Third cranial nerve innervates all of the following extraocular muscles except ?

Harrison's 18th Ed. 238

- A. Medial rectus
- B. Superior rectus
- C. Inferior oblique
- D. Superior oblique

1183 Total palsy of oculomotor nerve leaves the eye ?

Harrison's 18th Ed. 238

- A. Down and in
- B. Down and out
- C. Up and in
- D. Up and out

1184 Which of the following is false about III nerve palsy ?

Harrison's 18th Ed. 238

- A. Nothnagel's syndrome is ipsilateral III palsy and contralateral cerebellar ataxia
- B. Benedikt's syndrome is ipsilateral III nerve palsy and contralateral tremor, chorea, and athetosis
- C. Weber's syndrome is ipsilateral III nerve palsy with contralateral hemiparesis
- D. None of the above

1185 Which of the following is false about Trochlear Nerve ?

Harrison's 18th Ed. 238

- A. Palsy results in hypertropia
- B. Palsy results in excyclotorsion
- C. Head tilt test is diagnostic
- D. None of the above

1186 Isolated trochlear nerve palsy occurs due to all except ?

Harrison's 18th Ed. 238

- A. Infarction
- B. Herniation
- C. Aneurysm
- D. Tumour

1187 Foville's syndrome includes all except ?

Harrison's 18th Ed. 239

- A. Lateral gaze palsy
- B. Ipsilateral facial palsy
- C. Contralateral hemiparesis
- D. Contralateral hemianesthesia

1188 Which of the following is false about Millard-Gubler syndrome ?

Harrison's 18th Ed. 239

- A. Due to ventral pontine injury
- B. Lateral gaze palsy
- C. Ipsilateral facial palsy
- D. Contralateral hemiparesis

1189 Which of the following is false about Gradenigo's syndrome ?

Harrison's 18th Ed. 239

- A. Mastoiditis
- B. Deafness
- C. Ipsilateral abducens palsy
- D. None of the above

1190 Which of the following can produce ophthalmoplegia ?

Harrison's 18th Ed. 239

- A. Lambert-Eaton myasthenic syndrome
- B. Giant cell (temporal) arteritis
- C. Miller Fisher syndrome
- D. All of the above

1191 Most common cause of internuclear ophthalmoplegia is ?

Harrison's 18th Ed. 239

- A. Multiple sclerosis
- B. Intracranial tumor
- C. Stroke
- D. Concussion trauma

1192 Which of the following is false for Parinaud's Syndrome ?

Harrison's 18th Ed. 240

- A. Also known as dorsal midbrain syndrome
- B. Supranuclear vertical gaze disorder
- C. Hydrocephalus from aqueductal stenosis
- D. None of the above

- 1193 Which of the following has no relation with Parinaud's Syndrome ?**
Harrison's 18th Ed. 240
- A. Pineal region tumors
 - B. Beevor's sign
 - C. Setting sun sign
 - D. Collier's sign

377 - Diseases of the Spinal Cord

- 1194 What is the length of adult spinal cord ?**
Harrison's 18th Ed. 3366
- A. ~ 34 cm
 - B. ~ 40 cm
 - C. ~ 46 cm
 - D. ~ 52 cm

Adult spinal cord is ~46 cm (18 inches) long, oval in shape and enlarged in cervical & lumbar regions, where neurons that innervate upper & lower extremities, respectively, are located.

- 1195 The spinal cord has how many segments ?**
Harrison's 18th Ed. 3366
- A. 30
 - B. 31
 - C. 32
 - D. 33

Spinal cord has 31 segments, each defined by exiting ventral motor root & entering dorsal sensory root.

- 1196 Lumbar spinal cord segments correspond to which vertebral body ?**
Harrison's 18th Ed. 3366 Table 377-2
- A. T8-T10
 - B. T10 - T12
 - C. T12 - L1
 - D. L1

- 1197 Sacral spinal cord segments correspond to which vertebral body ?**
Harrison's 18th Ed. 3366 Table 377-2
- A. T11
 - B. T12
 - C. T12 - L1
 - D. L1

Upper cervical - same as cord level, lower cervical - 1 level higher, upper thoracic - 2 levels higher, lower thoracic - 2 to 3 levels higher, lumbar - T10 to T12 and sacral - T12 to L1.

- 1198 Uppermost level of a spinal cord lesion can be localized by ?**
Harrison's 18th Ed. 3367
- A. Sensory level
 - B. Segmental signs
 - C. Band of altered sensation
 - D. All of the above

- 1199 Intervertebral disks are responsible for what percentage of spinal column length ?**
Harrison's 17th Ed. 107
- A. 10 %

- B. 15 %
- C. 20 %
- D. 25 %

Intervertebral disks are composed of a central gelatinous nucleus pulposus surrounded by a tough cartilaginous ring, the annulus fibrosis. Disks are responsible for 25% of spinal column length.

- 1200 Intervertebral disks are largest in ?**
Harrison's 17th Ed. 107
- A. Cervical region
 - B. Thoracic region
 - C. Sacral region
 - D. None of the above

Intervertebral disks are largest in cervical & lumbar regions where movements of spine are greatest.

- 1201 Each vertebral arch gives rise to how many processes ?**
Harrison's 17th Ed. 107
- A. 3
 - B. 5
 - C. 7
 - D. 9

Seven processes arise from each vertebral arch - paired pedicles, paired laminae, paired transverse processes and one spinous process.

- 1202 Disk herniation at L4-L5 level commonly produces compression of ?**
Harrison's 17th Ed. 107
- A. S1 nerve root
 - B. S2 nerve root
 - C. S3 nerve root
 - D. S4 nerve root

Disk herniation at L4-L5 produces compression of S1 nerve root.

- 1203 Pain-sensitive structures in spine include all except ?**
Harrison's 17th Ed. 107
- A. Periosteum of vertebrae
 - B. Nucleus pulposus of intervertebral disk
 - C. Annulus fibrosus of intervertebral disk
 - D. Dura

Pain-sensitive structures in the spine include the periosteum of the vertebrae, dura, facet joints, annulus fibrosus of the intervertebral disk, epidural veins, and the posterior longitudinal ligament. The nucleus pulposus of the intervertebral disk is not pain-sensitive.

- 1204 Patrick sign is used to demonstrate pain due to ?**
Harrison's 17th Ed. 108
- A. Lumbar spine disease
 - B. Hip disease
 - C. Knee disease
 - D. Ankle disease

Patrick sign refers to elicitation of hip pain by internal and external rotation at the hip with the knee and hip in flexion.

- 1205 In supine position, passive flexion of extended leg at the hip stretches which of the following ?**
Harrison's 17th Ed. 108
- A. L5 nerve root
 - B. S1 nerve root

- C. Sciatic nerve
- D. All of the above

With the patient lying flat, passive flexion of the extended leg at the hip stretches the L5 and S1 nerve roots and the sciatic nerve.

1206 Reverse SLR sign stretches which of the following ?

Harrison's 17th Ed. 109

- A. L2 nerve root
- B. L4 nerve root
- C. Femoral nerve
- D. All of the above

Reverse SLR stretches the L2-L4 nerve roots and the femoral nerve.

1207 Which of the following is false about Tethered cord syndrome ?

Harrison's 17th Ed. 110

- A. Presents as progressive cauda equina disorder
- B. Perineal or perianal pain
- C. Low-lying conus (below L1-L2)
- D. Long and thickened filum terminale

Tethered cord syndrome presents as a progressive cauda equina disorder or myelopathy in a young adult who complains of perineal or perianal pain. Neuroimaging studies show a low-lying conus (below L1-L2) and a short & thickened filum terminale.

1208 Lumbar spinal stenosis can be caused by ?

Harrison's 17th Ed. 111

- A. Acromegaly
- B. Renal osteodystrophy
- C. Hypoparathyroidism
- D. All of the above

Lumbar spinal stenosis can be caused by epidural lipomatosis, osteoporosis, acromegaly, renal osteodystrophy, hypoparathyroidism, and Paget's disease.

1209 Which of the following spinal root value innervates axilla ?

Harrison's 17th Ed. 115 Table 16-4

- A. C8
- B. T1
- C. T2
- D. T3

1210 Spurling's sign relates to ?

Harrison's 17th Ed. 115

- A. Extension & lateral rotation of neck
- B. Flexion & lateral rotation of neck
- C. Extreme extension of neck
- D. Extreme flexion of neck

Extension & lateral rotation of neck narrows ipsilateral intervertebral foramen resulting in radicular symptoms (Spurling's sign).

1211 Cervical angina syndrome relates best with ?

Harrison's 17th Ed. 116

- A. Vertebrobasilar syndrome
- B. Coronary artery ischemia
- C. Subclavian steal syndrome
- D. All of the above

Cervical angina syndrome refers to pain in neck that is due to coronary artery ischemia.

1212 Horner's syndrome accompanies cervical cord lesion at ?

Harrison's 18th Ed. 3367

- A. C5
- B. C6
- C. C7
- D. Any cervical level

Horner's syndrome (miosis, ptosis & facial hypohidrosis) may accompany cervical cord lesion at any level.

1213 Lesions at C7 produce all except ?

Harrison's 18th Ed. 3367

- A. Weakness in finger extensors
- B. Weakness in wrist extensors
- C. Weakness in brachioradialis
- D. Weakness in triceps

At C7 lesion, weakness is found only in finger and wrist extensors and triceps.

1214 Lesions at C8 produces ?

Harrison's 18th Ed. 3367

- A. Weakness in finger and wrist flexors
- B. Weakness in finger extensors
- C. Weakness in wrist extensors
- D. Weakness in supination

At C8, finger and wrist flexion are impaired.

1215 Beevor's sign is positive in spinal cord lesion at ?

Harrison's 18th Ed. 3367

- A. T7 - T8
- B. T8 - T9
- C. T9 - T10
- D. T11 - T12

Lesions at T9-T10 paralyze the lower, but not the upper abdominal muscles, resulting in upward movement of the umbilicus when the abdominal wall contracts (Beevor's sign).

1216 Sensory dermatome at the level of nipples is ?

Harrison's 18th Ed. 3367

- A. T2
- B. T3
- C. T4
- D. T5

Dermatome at nipples is T4 and at umbilicus is T10.

1217 Lesions at L2 - L4 cause all except ?

Harrison's 18th Ed. 3367

- A. Weakness of flexion of thigh
- B. Weakness of abduction of thigh
- C. Weakness of leg extension at knee
- D. Absent patellar reflex

Lesions at L2 - L4 spinal cord levels paralyze flexion & adduction of thigh, weaken leg extension at knee and abolish the patellar reflex.

1218 Lesions at L5-S1 cause all except ?

Harrison's 18th Ed. 3367

- A. Paralyze movements of foot and ankle
- B. Weakness of flexion at knee

- C. Weakness of flexion of thigh
- D. Absent ankle jerk

Lesions at L5 - S1 paralyse movements of the foot & ankle, flexion at knee, and extension of thigh and abolish the ankle jerks (S1).

1219 Conus medullaris comprises of ?

Harrison's 18th Ed. 3367

- A. Lower lumbar + sacral + coccygeal segments
- B. Sacral + coccygeal segments
- C. Lower sacral + coccygeal segments
- D. None of the above

conus medullaris is the tapered caudal termination of the spinal cord, comprising of the lower sacral and single coccygeal segments.

1220 The conus syndrome is characterized by all except ?

Harrison's 18th Ed. 3367

- A. Bilateral saddle anesthesia
- B. Asymmetric leg weakness
- C. Bladder and bowel dysfunction
- D. Impotence

1221 The conus syndrome is characterized by all except ?

Harrison's 18th Ed. 3367

- A. Absent bulbocavernosus reflex
- B. Absent anal reflex
- C. Asymmetric sensory loss in leg
- D. Bilateral saddle anesthesia

1222 The root value of bulbocavernosus reflex is ?

Harrison's 18th Ed. 3367

- A. S1 - S2
- B. S2 - S4
- C. S3 - S5
- D. S4 - S5

1223 The root value of anal reflex is ?

Harrison's 18th Ed. 3367

- A. S1 - S2
- B. S2 - S4
- C. S3 - S5
- D. S4 - S5

Conus syndrome consists of bilateral saddle anesthesia (S3-S5), prominent bladder & bowel dysfunction (urinary retention & incontinence with lax anal tone), and impotence. Bulbocavernosus (S2-S4) & anal (S4-S5) reflexes are absent. Muscle strength is largely preserved.

1224 Cauda equina lesion is characterized by all except ?

Harrison's 18th Ed. 3367

- A. Radicular pain
- B. Asymmetric leg weakness
- C. Variable areflexia in lower extremities
- D. Bladder and bowel dysfunction

Lesions of cauda equina are characterized by low back & radicular pain, asymmetric leg weakness & sensory loss, variable areflexia in the lower extremities & relative sparing of bowel & bladder function.

1225 Which of the following is false about cauda equina syndrome ?

Harrison's 16th Ed. 137

- A. Sphincters are affected

- B. Hip flexion is spared
- C. Sensation over anterolateral thighs is spared
- D. None of the above

1226 In spinal cord, sacral fibres are placed laterally in all except ?

Harrison's 18th Ed. 3368 Figure 377-1

- A. Ventral spinothalamic tract
- B. Lateral spinothalamic tract
- C. Lateral corticospinal tract
- D. Posterior column

1227 In spinal posterior columns, fibres from which part of the body are nearest midline ?

Harrison's 18th Ed. 3368 Figure 377-1

- A. Cervical
- B. Thoracic
- C. Lumbar
- D. Sacral

1228 In lateral spinothalamic tracts, fibres from which part of the body are nearest midline ?

Harrison's 18th Ed. 3368 Figure 377-1

- A. Cervical
- B. Thoracic
- C. Lumbar
- D. Sacral

1229 In lateral corticospinal tracts, fibres from which part of the body are nearest midline ?

Harrison's 18th Ed. 3368 Figure 377-1

- A. Cervical
- B. Thoracic
- C. Lumbar
- D. Sacral

1230 Which of the following motor neurons in anterior horn of spinal cord are placed anteriorly ?

Harrison's 18th Ed. 3368 Figure 377-1

- A. Proximal
- B. Distal
- C. Flexors
- D. Extensors

1231 Brown-Sequard hemicord syndrome features all except ?

Harrison's 18th Ed. 3367

- A. Ipsilateral weakness
- B. Ipsilateral loss of joint position & vibratory sensation
- C. Contralateral loss of pain & temperature sensation
- D. Bilateral segmental signs

1232 Brown-Sequard syndrome is characterized by ?

Harrison's 18th Ed. 3367

- A. Absence of cranial nerve signs
- B. Ipsilateral loss of proprioception
- C. Contralateral loss pain & temperature
- D. All of the above

Brown-Sequard hemicord syndrome consists of ipsilateral weakness (corticospinal tract) and loss of joint position and vibratory sense (posterior column), with contralateral loss of pain and temperature sense (spinothalamic tract) one or two levels below the lesion. Segmental signs, such as radicular pain, muscle atrophy, or loss of a deep tendon reflex, are unilateral.

1233 Hemiparesis due to a cortical lesion is suggested by all except ?

Harrison's 16th Ed. 136

- A. "Pure motor" hemiparesis
- B. Disorders of visual-spatial integration
- C. Apraxia
- D. Seizures

1234 Diseases of the cerebral hemispheres that produce acute paraparesis include ?

Harrison's 16th Ed. 137

- A. Unpaired anterior cerebral artery ischemia
- B. Superior sagittal sinus or cortical venous thrombosis
- C. Acute hydrocephalus
- D. All of the above

1235 Acute monoparesis due to focal cortical ischemia is characterized by ?

Harrison's 16th Ed. 137

- A. Weakness is predominantly distal
- B. Weakness affects nonantigravity muscles
- C. Not associated with sensory impairment or pain
- D. All of the above

1236 Weakness limited to respiratory muscles is due to ?

Harrison's 16th Ed. 138

- A. Motor neuron disease
- B. Myasthenia gravis
- C. Polymyositis/dermatomyositis
- D. All of the above

1237 Which of the following is a cause of episodic generalized weakness ?

Harrison's 16th Ed. 137

- A. Myasthenia gravis
- B. Lambert-Eaton myasthenic syndrome
- C. Multiple sclerosis
- D. All of the above

1238 Which of the following is false about Stiff-Person Syndrome ?

Harrison's 16th Ed. 138

- A. Muscle stiffness & superimposed spasms
- B. Involves jaw
- C. Associated with cancers
- D. Serum antibody against glutamic acid decarboxylase present

1239 Which of the following is false about 'Tetany' ?

Harrison's 16th Ed. 138

- A. Tingling around mouth
- B. Manifestation of hypocalcemia
- C. Manifestation of respiratory alkalosis
- D. None of the above

1240 Which of the following is false about 'Neuromyotonia' ?

Harrison's 16th Ed. 138

- A. Muscle stiffness at rest & during sleep
- B. Distal limb muscles most severely affected
- C. Myokymia
- D. None of the above

1241 Central cord syndrome results from all except ?

Harrison's 18th Ed. 3367

- A. Trauma
- B. Infection
- C. Syringomyelia
- D. Anterior spinal artery ischemia

Central cord syndrome is due to damage to gray matter nerve cells & crossing spinothalamic tracts near the central spinal canal. Trauma, syringomyelia, tumors & anterior spinal artery ischemia cause central cord syndrome.

1242 Dissociated sensory loss in central cord syndrome means ?

Harrison's 18th Ed. 3367

- A. Loss of JPS & vibration sense with preservation of pain & temperature sense
- B. Loss of pain & temperature sense with preservation of JPS & vibration sense
- C. Loss of pain sense with preservation of temperature sense
- D. Loss of temperature sense with preservation of pain sense

In cervical cord, central cord syndrome produces arm weakness out of proportion to leg weakness and "dissociated" sensory loss (loss of pain & temperature sense with preservation of light touch, joint position, and vibration sense over shoulders, lower neck & upper trunk).

1243 Which of the following is false about anterior spinal artery syndrome ?

Harrison's 18th Ed. 3367

- A. Due to occlusion of anterior spinal artery
- B. Motor, sensory & autonomic functions are lost below the level of lesion
- C. Retained vibration & position sensation
- D. None of the above

Anterior spinal artery syndrome is due to infarction of spinal cord due to its occlusion or diminished flow. Destruction spares posterior columns. Motor, sensory and autonomic functions are lost below the level of lesion. Vibration and position sensation are retained.

1244 "Around the clock" pattern of weakness is seen in ?

Harrison's 18th Ed. 3367

- A. Central cord syndrome
- B. Anterior spinal artery syndrome
- C. Foramen magnum syndrome
- D. All of the above

Compressive lesions near foramen magnum produce weakness of ipsilateral shoulder & arm followed by weakness of ipsilateral leg, then contralateral leg, & finally contralateral arm, an "around the clock" pattern that may begin in any of 4 limbs. Typical suboccipital pain spreading to neck & shoulders is present.

1245 Which of the following features does not favour the diagnosis of extramedullary lesions ?

Harrison's 18th Ed. 3367

- A. Radicular pain
- B. Early sacral sensory loss
- C. Sparing of sensation in perineal & sacral areas

D. Spastic weakness in legs

Prominent radicular pain with early sacral sensory loss (lateral spinothalamic tract) & spastic weakness in legs (corticospinal tract) indicate extramedullary lesions.

1246 Which of the following features favours the diagnosis of intramedullary lesions ?

Harrison's 18th Ed. 3367

- A. Radicular pain
- B. Early corticospinal tract signs
- C. Sparing of sensation in perineal & sacral areas
- D. Spastic weakness in legs

Intramedullary lesions produce poorly localized burning pain & spare sensation in perineal and sacral areas ("sacral sparing"), due to laminated configuration of spinothalamic tract with sacral fibers outermost. corticospinal tract signs appear later.

1247 Which of the following features favours noncompressive myelopathy ?

Harrison's 18th Ed. 3368

- A. Neck or back pain
- B. Bladder disturbances
- C. Sensory symptoms preceding paralysis
- D. Myelopathy without antecedent symptoms

Epidural compression causes warning signs of neck or back pain, bladder disturbances and sensory symptoms that precede development of paralysis. Noncompressive etiologies produce myelopathy without antecedent symptoms.

1248 Which of the following malignant tumors usually do not metastasize to "thoracic" spinal cord ?

Harrison's 18th Ed. 3368

- A. Breast
- B. Kidney
- C. Ovary
- D. Lymphoma

Almost any malignant tumor can metastasize to spinal column with breast, lung, prostate, kidney, lymphoma & plasma cell dyscrasia being frequent. Thoracic cord is most commonly involved. Metastases from prostate & ovarian cancer occur disproportionately in sacral & lumbar vertebrae.

1249 Batson's plexus is composed of ?

Harrison's 18th Ed. 3368

- A. Nerves
- B. Arteries
- C. Veins
- D. Capillaries

Batson's plexus is a network of veins along the anterior epidural space.

1250 Pain in neoplastic epidural compressive myelopathy worsens with ?

Harrison's 18th Ed. 3368

- A. Movement
- B. Coughing
- C. Sneezing
- D. All of the above

Pain in neoplastic epidural compressive myelopathy typically worsens with movement, coughing or sneezing & awakens patients at night.

1251 Which of the following is false about intradural mass lesions ?

Harrison's 18th Ed. 3369

- A. Slow-growing & benign

- B. Initial symptom is radicular pain
- C. Asymmetric, progressive spinal cord syndrome
- D. None of the above

Most intradural mass lesions are slow-growing & benign. Symptoms usually begin with radicular sensory symptoms followed by an asymmetric, progressive spinal cord syndrome.

1252 Intradural neurofibromas typically arise near ?

Harrison's 18th Ed. 3369

- A. Anterior root
- B. Posterior root
- C. Radicle
- D. Any of the above

Intradural neurofibromas typically arise near the posterior root.

1253 Which of the following is a primary intramedullary tumor ?

Harrison's 18th Ed. 3370

- A. Ependymomas
- B. Hemangioblastomas
- C. Low-grade astrocytoma
- D. All of the above

Primary intramedullary tumors of spinal cord include ependymomas, hemangioblastomas, or low-grade astrocytomas in adults. They present as central cord or hemicord syndromes, often in cervical region.

1254 Clinical triad of spinal epidural abscess consists of all except ?

Harrison's 18th Ed. 3370

- A. Midline dorsal pain
- B. Fever
- C. Progressive limb weakness
- D. Sensory loss

Clinical triad of spinal epidural abscess consists of midline dorsal pain, fever & progressive limb weakness.

1255 Which of the following about spinal epidural abscess is false ?

Harrison's 18th Ed. 3370

- A. Infections of skin is a risk factor
- B. Commonly due to hematogenous spread
- C. Streptococcus most common bacteria
- D. Lumbar puncture is not recommended

Most cases of spinal epidural abscess are due to Staphylococcus aureus. Gram-negative bacilli, streptococcus, anaerobes, fungi and tuberculosis are other important causes.

1256 The spinal cord is supplied by how many arteries ?

Harrison's 18th Ed. 3371

- A. 1
- B. 2
- C. 3
- D. 4

Spinal cord is supplied by 3 arteries - single anterior spinal artery & paired posterior spinal arteries.

1257 Anterior spinal artery feeder - Artery of Adamkiewicz arises at ?

Harrison's 18th Ed. 3371

- A. C6
- B. T4 - T5
- C. T11 - L2
- D. L4 - L5

Anterior spinal artery is fed by radicular vessels that arise at C6, at an upper thoracic level, and most consistently, at T11 - L2 (artery of Adamkiewicz).

1258 Posterior spinal arteries become less distinct below ?

Harrison's 18th Ed. 3371

- A. Midcervical level
- B. Midthoracic level
- C. Midlumbar level
- D. Midsacral level

Posterior spinal arteries supply posterior columns & become less distinct below midthoracic level.

1259 With systemic hypotension, greatest ischemic risk of cord infarction is at the level of ?

Harrison's 18th Ed. 3371

- A. C6
- B. T3 - T4
- C. T11 - L2
- D. L5 - S1

With systemic hypotension, greatest ischemic risk is at T3 - T4 and also at boundary zones between anterior & posterior spinal artery territories.

1260 Which of the following is not a feature of anterior cord syndrome ?

Harrison's 18th Ed. 3371

- A. Paraplegia or quadriplegia
- B. Loss of pain & temperature sense
- C. Sparing of vibration & position sense
- D. Preservation of sphincter control

Anterior cord syndrome is due to acute infarction in the territory of anterior spinal artery that presents as paraplegia or quadriplegia, dissociated sensory loss affecting pain & temperature sense but sparing vibration & position sense, and loss of sphincter control. Sharp midline or radiating back pain localized to the area of ischemia is frequent.

1261 Spinal cord infarction is associated with ?

Harrison's 18th Ed. 3371

- A. Aortic atherosclerosis
- B. Dissecting aortic aneurysm
- C. Hypotension from any cause
- D. All of the above

Spinal cord infarction results from aortic atherosclerosis, dissecting aortic aneurysm, vertebral artery occlusion or dissection in neck, profound hypotension from any cause, cardiogenic emboli, vasculitis related to collagen vascular disease, and surgical interruption of aortic aneurysms.

1262 Recurrent episodes of myelitis are usually due to ?

Harrison's 18th Ed. 3371

- A. SLE
- B. Sarcoid
- C. Infection with HSV- 2
- D. All of the above

Recurrent episodes of myelitis are due to immune-mediated disease like demyelinating disease, SLE, or sarcoid or to infection with HSV type 2.

1263 Immune-mediated disorders causing acute transverse myelopathies (ATM) include ?

Harrison's 18th Ed. 3372

- A. SLE
- B. Sjogren's syndrome

- C. Behcet's syndrome
- D. All of the above

Immune-mediated myelitides include Sjögren's syndrome, mixed connective tissue disease, Behçet's syndrome, and vasculitis with perinuclear antineutrophilic cytoplasmic (p-ANCA) antibodies.

1264 Antiphospholipid antibodies are found in which of the following immune-mediated disorders ?

Harrison's 18th Ed. 3372

- A. SLE
- B. Sjogren's syndrome
- C. Behcet's syndrome
- D. RA

Myelitis occurs in SLE associated with antiphospholipid antibodies.

1265 In which of the following myelopathies, a large edematous swelling of spinal cord mimicking tumor is observed ?

Harrison's 18th Ed. 3372

- A. SLE
- B. Sarcoidosis
- C. Sjogren's syndrome
- D. Behcet's syndrome

In sarcoid myelopathy, an edematous swelling of spinal cord may mimic tumor.

1266 Typical neurologic manifestation of sarcoidosis is ?

Harrison's 18th Ed. 3372

- A. Cranial neuropathy
- B. Hypothalamic involvement
- C. Meningeal enhancement visualized by MRI
- D. All of the above

Typical neurologic manifestation of sarcoidosis are cranial neuropathy, hypothalamic involvement or meningeal enhancement visualized by MRI.

1267 Neuromyelitis optica (NMO) is associated with ?

Harrison's 18th Ed. 3372

- A. Antiphospholipid antibodies
- B. SLE
- C. Connective tissue diseases
- D. All of the above

NMO is a demyelinating syndrome of severe myelopathy with optic neuritis which is bilateral & may precede or follow myelitis by weeks or months. NMO is also associated with SLE, antiphospholipid antibodies and with other connective tissue diseases.

1268 Recurrent sacral myelitis which mimic multiple sclerosis is due to ?

Harrison's 18th Ed. 3372

- A. HSV - 2
- B. Herpes zoster
- C. Epstein-Barr virus (EBV)
- D. Cytomegalovirus (CMV)

HSV-2 causes recurrent sacral myelitis along with outbreaks of genital herpes mimicking MS.

1269 Acyclovir is useful in treatment of myelitis caused by which of the following viruses ?

Harrison's 18th Ed. 3372

- A. Herpes zoster

- B. HSV
- C. EBV
- D. All of the above

Herpes zoster, HSV & EBV myelitis are treated with IV acyclovir or oral valacyclovir for 10 - 14 days.

1270 Which of the following is not a type of chronic myelopathy ?

Harrison's 18th Ed. 3372

- A. Syringomyelia
- B. Tabes dorsalis
- C. HSV myelitis
- D. Subacute combined degeneration of cord

1271 Foix-Alajouanine syndrome best relates with ?

Harrison's 18th Ed. 3373

- A. Arteriovenous malformations
- B. Progressive thoracic myelopathy
- C. Paraparesis
- D. All of the above

1272 Which of the following is false about syringomyelia ?

Harrison's 18th Ed. 3373

- A. Acquired or developmental
- B. Symptoms begin in adolescence or early adulthood
- C. Associated with Chiari type 1 malformations
- D. None of the above

1273 Which of the following is false about syringomyelia ?

Harrison's 18th Ed. 3373

- A. Dissociated sensory loss in upper limbs
- B. Areflexic weakness in upper limbs
- C. Spasticity and weakness of the legs
- D. None of the above

Dissociated sensory loss can reflect spinothalamic tract involvement in spinal cord (bilateral spinothalamic tract involvement occurs in syringomyelia). There occurs impairment of pinprick & temperature appreciation but relative preservation of light touch, position sense & vibration appreciation.

1274 Which of the following is false about chronic myelopathy of multiple sclerosis ?

Harrison's 18th Ed. 3374

- A. Bilateral
- B. Asymmetric
- C. Motor, sensory, and bladder/bowel disturbances
- D. None of the above

In chronic progressive myelopathy of MS, involvement is typically bilateral but asymmetric & produces motor, sensory & bladder/bowel disturbances.

1275 Which of the following is false about subacute combined degeneration of cord ?

Harrison's 18th Ed. 3374

- A. Loss of deep tendon reflexes
- B. Babinski sign
- C. Romberg's sign
- D. None of the above

1276 Which of the following is false about subacute combined degeneration of cord ?

Harrison's 18th Ed. 3374

- A. Macrocytic red blood cells
- B. Elevated serum levels of homocysteine
- C. Elevated serum levels of methylmalonic acid
- D. None of the above

1277 Which of the following condition is virtually identical to subacute combined degeneration ?

Harrison's 18th Ed. 3374

- A. Adrenomyeloneuropathy
- B. Tabes Dorsalis
- C. Familial Spastic Paraplegia
- D. Hypocupric myelopathy

Hypocupric myelopathy is virtually identical to subacute combined degeneration but with normal serum levels of B_{12} , low levels of serum copper and low level of serum ceruloplasmin.

1278 Which of the following condition producing myelopathy identical to subacute combined degeneration ?

Harrison's 18th Ed. 3374

- A. Adrenomyeloneuropathy
- B. Tabes Dorsalis
- C. Familial Spastic Paraplegia
- D. Nitrous oxide inhalation

Nitrous oxide inhalation producing a myelopathy identical to subacute combined degeneration.

1279 Which of the following is false about tabes dorsalis ?

Harrison's 18th Ed. 3375

- A. Fleeting & repetitive lancinating pains in legs
- B. Ataxia
- C. Acute abdominal pain with vomiting
- D. None of the above

1280 Which of the following is false about tabes dorsalis ?

Harrison's 18th Ed. 3375

- A. Loss of deep tendon reflexes in legs
- B. Impaired position & vibratory sense
- C. Romberg's sign
- D. None of the above

1281 Which of the following polyradiculopathy may simulate tabes dorsalis ?

Harrison's 18th Ed. 3375

- A. Non-Hodgkin's lymphoma
- B. EBV polyradiculopathy
- C. CMV polyradiculopathy
- D. Diabetic polyradiculopathy

1282 Which of the following is false about adrenomyeloneuropathy ?

Harrison's 18th Ed. 3375

- A. Mixed motor & sensory neuropathy
- B. Flaccid paraplegia
- C. Elevated levels of very long chain fatty acids
- D. Adrenal insufficiency

Adrenomyeloneuropathy is associated with a mixed motor & sensory neuropathy with spastic paraplegia in adults associated with elevated circulating levels of very long chain fatty acids and adrenal insufficiency. The responsible gene encodes ADLP.

1283 Lathyrism is due to ingestion of faulty ?

Harrison's 18th Ed. 3375

- A. Peas
- B. Chick peas
- C. Soyabean
- D. Barley

Lathyrism due to ingestion of chick peas containing the excitotoxin β -N-oxalylaminoalanine (BOAA).

1284 The prospects for recovery from an acute destructive spinal cord lesion fade after ?

Harrison's 18th Ed. 3375

- A. ~ 1 month
- B. ~ 3 months
- C. ~ 6 months
- D. ~ 12 months

The prospects for recovery from an acute destructive spinal cord lesion fade after ~6 months.

1285 In cervical radiculopathy, weakness of deltoid, supraspinatus & infraspinatus muscles signify lesion in which root ?

N Engl J Med 2005;353:392-9

- A. C5
- B. C6
- C. C7
- D. C8

1286 In cervical radiculopathy, weakness of biceps, brachioradialis, wrist extensor muscles signify lesion in the root ?

N Engl J Med 2005;353:392-9

- A. C5
- B. C6
- C. C7
- D. C8

1287 In cervical radiculopathy, weakness of triceps, wrist flexor, finger extensor muscles signify lesion in the root ?

N Engl J Med 2005;353:392-9

- A. C5
- B. C6
- C. C7
- D. C8

1288 In cervical radiculopathy, weakness of thumb flexors, abductors, intrinsic hand muscles signify lesion in the root ?

N Engl J Med 2005;353:392-9

- A. C5
- B. C6
- C. C7
- D. C8

1289 In cervical radiculopathy, sensory loss over lateral upper arm signifies lesion in the root ?

N Engl J Med 2005;353:392-9

- A. C5
- B. C6
- C. C7
- D. C8

1290 In cervical radiculopathy, sensory loss over thumb and index finger signifies lesion in the root ?

N Engl J Med 2005;353:392-9

- A. C5
- B. C6
- C. C7
- D. C8

1291 In cervical radiculopathy, sensory loss over posterior forearm and third finger signifies lesion in the root ?

N Engl J Med 2005;353:392-9

- A. C5
- B. C6
- C. C7
- D. C8

1292 In cervical radiculopathy, sensory loss over fifth finger signifies lesion in the root ?

N Engl J Med 2005;353:392-9

- A. C5
- B. C6
- C. C7
- D. C8

1293 In cervical radiculopathy, loss of supinator reflex signifies lesion in the root ?

N Engl J Med 2005;353:392-9

- A. C5
- B. C6
- C. C7
- D. C8

1294 In cervical radiculopathy, loss of biceps reflex signifies lesion in the root ?

N Engl J Med 2005;353:392-9

- A. C5
- B. C6
- C. C7
- D. C8

1295 In cervical radiculopathy, loss of triceps reflex signifies lesion in the root ?

N Engl J Med 2005;353:392-9

- A. C5
- B. C6
- C. C7
- D. C8

1296 In cervical radiculopathy, pain in the region of medial scapular border, lateral upper arm to elbow signifies lesion in the root ?

N Engl J Med 2005;353:392-9

- A. C5
- B. C6
- C. C7
- D. C8

1297 In cervical radiculopathy, pain in the region of lateral forearm, thumb and index finger signifies lesion in the root ?

N Engl J Med 2005;353:392-9

- A. C5
- B. C6
- C. C7
- D. C8

1298 In cervical radiculopathy, pain in the region of medial scapula, posterior arm, dorsum of forearm & third finger signifies lesion in the root ?

N Engl J Med 2005;353:392-9

- A. C5
- B. C6
- C. C7
- D. C8

1299 In cervical radiculopathy, pain in the region of shoulder, ulnar side of forearm, fifth finger signifies lesion in the root ?

N Engl J Med 2005;353:392-9

- A. C5
- B. C6
- C. C7
- D. C8

1300 Spurling maneuver is ?

N Engl J Med 2005;353:392-9

- A. Foraminal compression test in cervical radiculopathy
- B. Opposite of Valsalva maneuver
- C. Other name of hyperventilation
- D. Breath holding test

1301 Parsonage - Turner syndrome refers to ?

N Engl J Med 2005;353:392-9

- A. Acute brachial-plexus neuritis
- B. Peripheral entrapment neuropathies
- C. Disorders of the rotator cuff and shoulder
- D. Referred somatic pain from the neck

1302 Differential diagnosis of cervical radiculopathy include ?

N Engl J Med 2005;353:392-9

- A. Peripheral entrapment neuropathies
- B. Disorders of rotator cuff & shoulder
- C. Acute brachial-plexus neuritis
- D. All of the above

1303 Differential diagnosis of cervical radiculopathy include ?

N Engl J Med 2005;353:392-9

- A. Thoracic outlet syndrome
- B. Herpes zoster
- C. Pancoast syndrome
- D. All of the above

1304 Tinel's sign and Phalen's maneuver best relate to ?

N Engl J Med 2005;353:392-9

- A. Thoracic outlet syndrome

- B. Acute brachial-plexus neuritis
- C. Carpal tunnel syndrome
- D. Pancoast syndrome

1305 Hypoesthesia and weakness in medial three digits and opponens pollicis occurs in ?

N Engl J Med 2005;353:392-9

- A. Median nerve entrapment
- B. Ulnar nerve entrapment
- C. Thoracic outlet syndrome
- D. Pancoast syndrome

1306 Hypoesthesia and weakness in the fourth and fifth digits and thumb adductor occurs in ?

N Engl J Med 2005;353:392-9

- A. Median nerve entrapment
- B. Ulnar nerve entrapment
- C. Thoracic outlet syndrome
- D. Pancoast syndrome

1307 Which of the following statements about Roo's test is false ?

N Engl J Med 2005;353:392-9

- A. It is a kind of provocation test
- B. Used for diagnosis of Thoracic outlet syndrome
- C. Done by rapid flexion and extension of fingers while the arms are abducted at 90° and externally rotated 90°
- D. Intermittent paresthesia, most commonly in C5 region

Transverse Myelitis

1308 Which of the following does not relate well with transverse myelitis ?

N Engl J Med 2010;363:564-72

- A. Inflammatory disorder
- B. Acute
- C. Subacute
- D. Chronic

Transverse myelitis is a heterogeneous group of acute or subacute inflammatory disorders with motor, sensory and autonomic (bladder, bowel, and sexual) spinal cord dysfunction.

1309 Transverse myelitis syndrome "most often" occurs due to ?

N Engl J Med 2010;363:564-72

- A. Autoimmune phenomenon after infection or vaccination
- B. Direct infection
- C. Underlying systemic autoimmune disease
- D. Acquired demyelinating disease

Transverse myelitis syndrome most often occurs as an autoimmune phenomenon after an infection or vaccination or as a result of a direct infection, an underlying systemic autoimmune disease, acquired demyelinating disease (multiple sclerosis) or idiopathic (15 - 30%)

1310 In transverse myelitis, most of the recovery occurs over ?

N Engl J Med 2010;363:564-72

- A. First 3 months after the event
- B. First 6 months after the event
- C. First 12 months after the event

- D. First 18 months after the event

Most of the recovery in transverse myelitis cases occurs in the first 3 months after the event. Although, improvement may continue for a year or longer.

1311 Pathological hallmark of transverse myelitis within the spinal cord is ?

N Engl J Med 2010;363:564-72

- A. Focal collections of neutrophils
- B. Focal collections of lymphocytes & monocytes
- C. Focal collections of eosinophils
- D. Focal collections of basophils

In spinal cord, pathological hallmark of transverse myelitis is the presence of focal collections of lymphocytes and monocytes, with varying degrees of demyelination, axonal injury and astroglial and microglial activation.

1312 Prognosis in transverse myelitis associated with multiple sclerosis is ?

N Engl J Med 2010;363:564-72

- A. Good
- B. Bad
- C. Worse
- D. Worst

Transverse myelitis associated with multiple sclerosis may have a substantial or even complete recovery. Transverse myelitis or neuromyelitis optica associated with other diseases usually have clinically significant residual neurologic deficits.

1313 "Spinal shock" consists of all except ?

N Engl J Med 2010;363:564-72

- A. Areflexia
- B. Sensory loss
- C. Severe weakness
- D. Hypotonia

"Spinal shock" refers to a combination of severe weakness, hypotonia and areflexia. It is the only recognized predictor of a poor outcome in transverse myelitis.

1314 Which of the following best distinguishes myelopathy from cerebral lesions and peripheral neuropathies ?

N Engl J Med 2010;363:564-72

- A. Seizure
- B. Sensory level
- C. Babinski signs
- D. Course of illness

A well-defined truncal sensory level, below which the sensation of pain & temperature is altered or lost, distinguishes myelopathy from cerebral lesions & peripheral neuropathies.

1315 Which of the following is responsible for the Lhermitte's sign in transverse myelitis ?

N Engl J Med 2010;363:564-72

- A. Demyelination
- B. Axonal injury
- C. Astroglial activation
- D. Microglial activation

Demyelination is responsible for the Lhermitte's sign that refers to the paresthesias that radiate down the spine or limbs with neck flexion. Demyelination is responsible for the paroxysmal tonic spasms i.e. involuntary dystonic contractions of limb or trunk muscles.

1316 Which of the following is false about idiopathic transverse myelitis ?

N Engl J Med 2010;363:564-72

- A. No cerebrospinal fluid abnormalities
- B. No MRI abnormalities
- C. No identifiable underlying cause
- D. None of the above

Patients with possible idiopathic transverse myelitis have clinical events consistent with transverse myelitis but that are not associated with cerebrospinal fluid abnormalities or abnormalities detected on MRI and that have no identifiable underlying cause.

1317 Presentation in transverse myelitis include ?

N Engl J Med 2010;363:564-72

- A. Sensory spinal cord dysfunction
- B. Motor spinal cord dysfunction
- C. Autonomic spinal cord dysfunction
- D. All of the above

Diagnostic criteria for transverse myelitis include bilateral (not necessarily symmetric) sensorimotor and autonomic spinal cord dysfunction.

1318 In transverse myelitis, clinical deficits progress to nadir between ?

N Engl J Med 2010;363:564-72

- A. 4 hours and 7 days after symptom onset
- B. 4 hours and 14 days after symptom onset
- C. 4 hours and 21 days after symptom onset
- D. 4 hours and 28 days after symptom onset

Progression to nadir of clinical deficits between 4 hours and 21 days after symptom onset is characteristic of transverse myelitis.

1319 Which of the following is true for MRI findings characteristic of myelitis ?

N Engl J Med 2010;363:564-72

- A. More than one intrinsic cord lesions
- B. Intrinsic cord lesions span at least two vertebral segments
- C. Lesions enhance with intravenous gadolinium
- D. All of the above

MRI finding of more than one intrinsic cord lesion is characteristic of myelitis. In acute phase, lesions enhance with intravenous gadolinium administration. Lesions in idiopathic transverse myelitis usually span at least two vertebral segments. Normal MRI should prompt a reconsideration of the diagnosis of myelopathy in favor of other disorders of the central or peripheral nervous system.

1320 Serum autoantibodies like antinuclear antibody or extractable nuclear antigen are present in ?

N Engl J Med 2010;363:564-72

- A. Multiple sclerosis
- B. Neuromyelitis optica
- C. Systemic lupus erythematosus
- D. All of the above

Serum autoantibodies like antinuclear antibody or extractable nuclear antigen may be present in patients with multiple sclerosis or neuromyelitis optica, systemic lupus erythematosus.

1321 MRI findings in multiple sclerosis include ?

N Engl J Med 2010;363:564-72

- A. Short lesions spanning less than two vertebral segments
- B. Lesions located in the periphery of the cord
- C. Concomitant MRI evidence of demyelinating brain lesions
- D. All of the above

Multiple sclerosis is associated with short lesions, spanning fewer than two vertebral segments, located in the periphery of the cord, affecting mainly white matter ("partial" transverse myelitis), and concomitant MRI evidence of demyelinating brain lesions.

- 1322 MRI findings in Neuromyelitis optica include ?**
N Engl J Med 2010;363:564-72
- A. Longitudinally extensive lesions spanning three or more vertebral segments
 - B. Symmetric lesions
 - C. Lesions situated centrally within the cord
 - D. All of the above

Neuromyelitis optica is strongly associated with longitudinally extensive transverse myelitis, defined by a lesion that spans three or more vertebral segments on MRI. Such lesions tend to be symmetric and situated centrally within the cord (involving both gray and white matter) and may extend into the brain stem, causing nausea, vomiting, and hiccups.

- 1323 Serum autoantibody marker NMO-IgG targets ?**
N Engl J Med 2010;363:564-72
- A. Beta2GPI
 - B. aCL
 - C. Astrocytic water channel, aquaporin-4
 - D. Anti-LKM3

Neuromyelitis optica is specifically associated with the serum autoantibody marker NMO-IgG, which targets the astrocytic water channel, aquaporin-4.

- 1324 Which of the following is not a monophasic syndrome ?**
N Engl J Med 2010;363:564-72
- A. Postinfectious transverse myelitis
 - B. Postvaccination transverse myelitis
 - C. Idiopathic transverse myelitis
 - D. Multiple sclerosis

Postinfectious, postvaccination and idiopathic forms of transverse myelitis are usually monophasic syndromes, whereas multiple sclerosis and neuromyelitis optica.spectrum disorders are relapsing diseases that are associated with a high risk of future attacks of transverse myelitis and other neurologic events.

- 1325 What happens to the IgG index in transverse myelitis ?**
N Engl J Med 2010;363:564-72
- A. Normal
 - B. Decreased
 - C. Increased
 - D. Any of the above

IgG index is a measure of intrathecal synthesis of immunoglobulin and is calculated by the following formula - (CSF IgG ÷ serum IgG) ÷ (CSF albumin ÷ serum albumin).

Chapter 379. Primary and Metastatic Tumors of the Nervous System

- 1326 Which is the most common primary CNS tumor ?**
Harrison's 18th Ed. 3382
- A. Glial tumors
 - B. Meningiomas
 - C. Schwannomas
 - D. Pituitary adenoma

Glial tumors account for 50 - 60% of primary brain tumors, meningiomas for 25%, schwannomas for 10%, & other CNS tumors for the remainder.

- 1327 Brain tumors usually present with ?**
Harrison's 18th Ed. 3382
- A. Progressive focal neurologic deficits
 - B. Seizure
 - C. Nonfocal neurologic disorder
 - D. Any of the above

Brain tumors may present with subacute progression of a focal neurologic deficit, seizure, or nonfocal neurologic disorder like headache, dementia, personality change or gait disorder.

- 1328 Brain tumor frequently associated with hemorrhage is ?**
Harrison's 17th Ed. 2601
- A. High-grade glioma
 - B. Metastatic melanoma
 - C. Choriocarcinoma
 - D. All of the above

Brain tumors frequently associated with hemorrhage include high-grade gliomas, metastatic melanoma and choriocarcinoma.

- 1329 Features of headache due to increased ICP include all except ?**
Harrison's 18th Ed. 3382
- A. Frontal
 - B. Episodic
 - C. Frequency more than once a day
 - D. Develop rapidly, subside quickly

Headaches due to increased ICP are usually holocephalic.

- 1330 What level of 'Karnofsky performance status' have a poor prognosis in patients with brain tumor ?**
Harrison's 17th Ed. 2602
- A. < 70
 - B. < 80
 - C. < 90
 - D. < 100

Karnofsky performance scale is meant to assess patients with brain tumors. A score >=70 indicates that patient is ambulatory & independent in self-care activities.

- 1331 CSF has higher probability of containing malignant cells in ?**
Harrison's 17th Ed. 2602
- A. Leptomeningeal metastases
 - B. Primary CNS lymphoma
 - C. Medulloblastoma
 - D. All of the above

CSF contains malignant cells in leptomeningeal metastases, primary CNS lymphoma and primitive neuroectodermal tumors (medulloblastoma).

- 1332 Which of the following is associated with increased risk for deep vein thrombosis & pulmonary embolism ?**
Harrison's 17th Ed. 2602
- A. Leptomeningeal metastases
 - B. Primary CNS lymphoma
 - C. Medulloblastoma
 - D. All of the above

Gliomas & primary CNS lymphomas are associated with increased risk for DVT & PE because these tumors secrete procoagulant factors.

1333 Well-documented environmental risk factor for the development of gliomas is ?
Harrison's 18th Ed. 3383

- A. Benzene
- B. Cadmium
- C. Ionizing radiation
- D. Ozone

For majority of primary brain tumors, the only established risk factors are exposure to ionizing radiation (meningiomas, gliomas, and schwannomas) and immunosuppression (primary CNS lymphoma).

1334 Hereditary syndromes associated with an increased risk of brain tumors includes all except ?
Harrison's 18th Ed. 3384 Table 379-2

- A. Li-Fraumeni syndrome
- B. Turcot syndrome
- C. Werner syndrome
- D. Pearson syndrome

Pearson syndrome is a mitochondrial disease consisting of pancreatic insufficiency, pancytopenia and lactic acidosis.

1335 Nervous system neoplasm seen in tuberous sclerosis is ?
Harrison's 18th Ed. 3384 Table 379-2

- A. Astrocytoma
- B. Malignant glioma
- C. Medulloblastoma
- D. Hemangioblastoma

Subependymal giant cell astrocytoma mostly occurs in tuberous sclerosis.

1336 Pheochromocytoma is associated with which of the following hereditary syndrome ?
Harrison's 18th Ed. 3384 Table 379-2

- A. Li-Fraumeni syndrome
- B. Turcot syndrome
- C. Werner syndrome
- D. von Hippel-Lindau syndrome

1337 Which of the following is a robust predictor of aggressive behavior of brain tumours ?
Harrison's 17th Ed. 2602

- A. Hypercellularity
- B. Nuclear and cytoplasmic atypia
- C. Endothelial proliferation
- D. Mitotic activity

1338 Which of the following is a robust predictor of aggressive behavior of brain tumours ?
Harrison's 17th Ed. 2602

- A. Hypercellularity
- B. Nuclear and cytoplasmic atypia
- C. Necrosis
- D. Mitotic activity

Histologic features of higher grade are hypercellularity, nuclear & cytoplasmic atypia, endothelial proliferation, mitotic activity & necrosis. Endothelial proliferation & necrosis are strong predictors of aggressive behavior.

1339 The proliferation index of brain tumours can be determined by a monoclonal antibody termed ?
Harrison's 17th Ed. 2602

- A. Ki-66
- B. Ki-67
- C. Ki-68
- D. Ki-69

Proliferation index (mitotic activity) can be determined with monoclonal antibody Ki-67 which recognizes a histone protein expressed in proliferating but not quiescent cells.

1340 Out of the following, most common childhood brain tumor is ?
Harrison's 18th Ed. 3384

- A. Pilocytic astrocytoma
- B. Subependymal giant cell astrocytoma
- C. Pleiomorphic xanthoastrocytoma
- D. Glioblastoma multiforme

Pilocytic astrocytoma (spindle-shaped cells) is the most common childhood brain tumor and is typically benign.

1341 Which of the following is the preferred drug for high-grade astrocytomas ?
Harrison's 18th Ed. 3385

- A. Temozolomide
- B. Carmustine (BCNU)
- C. Lomustine (CCNU)
- D. Vincristine

1342 Systemic combination chemotherapy (PCV) for oligodendrogliomas includes all except ?
Harrison's 18th Ed. 3386

- A. Procarbazine
- B. Lomustine
- C. Temozolomide
- D. Vincristine

Oligodendrogliomas respond well to systemic combination chemotherapy with procarbazine, lomustine, and vincristine (PCV), or to temozolomide.

1343 Oligodendrogliomas with deletions of which chromosome always respond to chemotherapy ?
Harrison's 18th Ed. 3386

- A. 1p
- B. 2p
- C. 3p
- D. 4p

Oligodendrogliomas with deletions of chromosome 1p always respond to chemotherapy.

1344 In adults, ependymomas of spinal canal are mostly located in ?
Harrison's 18th Ed. 3387

- A. Cervical region
- B. Thoracic region
- C. Lumbosacral region
- D. All of the above

In adults, myxopapillary histologic type is the most frequent ependymoma, which typically arises from the filum terminale of the spinal cord and appears in the lumbosacral region.

1345 Schwannoma most frequently involves which cranial nerve ?

Harrison's 18th Ed. 3388

- A. II
- B. III
- C. V
- D. VIII

1346 Cranial nerve where Schwannoma never occur is ?

Harrison's 18th Ed. 3388

- A. II
- B. III
- C. VIII
- D. XI

Schwannomas are most frequent in the vestibular division of VIII cranial nerve, fifth cranial nerve is the second most frequent site. Schwannomas are not found in optic & olfactory nerves as they are myelinated by oligodendroglia rather than by Schwann cells.

1347 Lisch nodules relate best to ?

Harrison's 18th Ed. 3389

- A. Ocular lens
- B. Iris
- C. Retina
- D. Conjunctiva

Hamartomas of the iris are called Lisch nodules.

1348 NF1 gene is on chromosome ?

Harrison's 18th Ed. 3389

- A. 1
- B. 4
- C. 9
- D. 17

Tumor-suppressor NF1 gene on chromosome 17. Its mutation causes von Recklinghausen's disease. It encodes protein neurofibromin. NF2 gene is on chromosome 22q, & encodes neurofibromin 2, schwannomin, or merlin.

1349 Bourneville's disease is also called ?

Harrison's 18th Ed. 3390

- A. Meningioma
- B. Tuberous sclerosis
- C. Ependymoma
- D. Primary CNS lymphoma

Tuberous sclerosis is also called Bourneville's disease.

1350 Shagreen patches are best related to ?

Harrison's 18th Ed. 3390

- A. Secondary syphilis
- B. Neurofibromatosis Type 1
- C. Tuberous sclerosis
- D. Von Hippel-Lindau syndrome

Shagreen patches are yellowish thickenings of skin over lumbosacral region of the back, seen in tuberous sclerosis.

1351 Tuberous sclerosis is characterized by all except ?

Harrison's 18th Ed. 3390

- A. Cutaneous lesions
- B. Seizures

C. Deafness

D. Mental retardation

Tuberous sclerosis is characterized by cutaneous lesions, seizures, and mental retardation.

1352 Cutaneous lesions in tuberous sclerosis include all except ?

Harrison's 18th Ed. 3390

- A. Adenoma sebaceum
- B. Ash leaf - shaped hypopigmented macules
- C. Lentigo
- D. Shagreen patches

In tuberous sclerosis, earliest cutaneous sign is an ash leaf spot.

1353 Hemangioblastomas in Von Hippel-Lindau syndrome are seen in ?

Harrison's 17th Ed. 2607

- A. Retina
- B. Cerebellum
- C. Spinal cord
- D. All of the above

VHL syndrome consists of retinal, cerebellar, and spinal hemangioblastomas, which are slowly growing cystic tumors.

1354 Hemangioblastomas in Von Hippel-Lindau syndrome produce which hormone ?

Harrison's 17th Ed. 2607

- A. Parathyroid hormone (PTH)
- B. Calcitonin
- C. Erythropoietin
- D. Antidiuretic hormone

Erythropoietin produced by hemangioblastomas results in polycythemia.

1355 Which of the following is the most common origin of brain metastases ?

Harrison's 18th Ed. 3390

- A. Ca. lung
- B. Ca. ovary
- C. Ca. thyroid
- D. Ca. prostate

Lung cancers (primary & metastatic) are the most common origin of brain metastases.

1356 Breast cancer has a propensity to metastasize to ?

Harrison's 18th Ed. 3390

- A. Anterior pituitary gland
- B. Cerebellum
- C. Frontal cortex
- D. Occipital cortex

1357 Breast cancer has a propensity to metastasize to ?

Harrison's 18th Ed. 3390

- A. Anterior pituitary gland
- B. Posterior pituitary gland
- C. Hypothalamus
- D. Hippocampus

Breast cancer (esp. ductal carcinoma) has a propensity to metastasize to the cerebellum and the posterior pituitary gland.

1358 Which of the following cancers rarely metastasize to brain ?*Harrison's 18th Ed. 3390*

- A. Prostate cancer
- B. Ovarian cancer
- C. Hodgkin's disease
- D. All of the above

*Prostate & ovarian cancer & Hodgkin's disease rarely metastasize to brain.***1359 Differential diagnosis of ring-enhancement lesions include ?***Harrison's 18th Ed. 3387*

- A. Brain abscess
- B. Radiation necrosis
- C. Toxoplasmosis
- D. All of the above

1360 Differential diagnosis of ring-enhancement lesions include ?*Harrison's 18th Ed. 3387*

- A. Granulomas
- B. Demyelinating lesions
- C. Primary brain tumors
- D. All of the above

1361 Differential diagnosis of ring-enhancement lesions include ?*Harrison's 18th Ed. 3387*

- A. Primary CNS lymphoma
- B. Stroke
- C. Hemorrhage
- D. All of the above

*Radiologically, ring-enhancing lesions includes brain abscess, radiation necrosis, toxoplasmosis, granulomas, tuberculosis, sarcoidosis, demyelinating lesions, primary brain tumors, primary CNS lymphoma, stroke, hemorrhage, and trauma.***1362 In vegetative state which of the following persists ?***Harrison's 16th Ed. 1625*

- A. Yawning
- B. Coughing
- C. Swallowing
- D. All of the above

1363 Which out of the following is a clinically more aggressive tumor ?*Harrison's 17th Ed. 2607*

- A. Juvenile pilocytic astrocytoma
- B. Subependymal giant cell astrocytoma
- C. Pleomorphic xanthoastrocytoma
- D. Glioblastoma multiforme

*Grade IV GBM is a clinically aggressive tumor.***1364 Brain tumor metastases that spread to spinal cord via CSF pathways are termed ?***Harrison's 16th Ed. 2455*

- A. Pin metastases
- B. Hanging metastases
- C. Drop metastases
- D. Confluent metastases

1365 Which of the following is a germ cell tumor ?*Harrison's 16th Ed. 2455*

- A. Teratoma
- B. Yolk sac tumor
- C. Choriocarcinoma
- D. All of the above

1366 Breast cancer that metastasizes to which of the following tends not to metastasize to brain ?*Harrison's 16th Ed. 2458*

- A. Pleura
- B. Bone
- C. Lung
- D. Liver

380 - Multiple Sclerosis and Other Demyelinating Diseases

1367 Which of the following is false about demyelinating disorders ?*Harrison's 18th Ed. 3395*

- A. Immune-mediated preferential destruction of CNS myelin
- B. Peripheral nervous system (PNS) is spared
- C. No evidence of associated systemic illness
- D. None of the above

*Demyelinating disorders are immune-mediated conditions characterized by preferential destruction of central nervous system (CNS) myelin. The peripheral nervous system (PNS) is spared, and most patients have no evidence of an associated systemic illness.***1368 Triad in multiple sclerosis (MS) includes all except ?***Harrison's 18th Ed. 3395*

- A. Inflammation
- B. Demyelination
- C. Remyelination
- D. Gliosis

*Multiple sclerosis is characterized by a triad of inflammation, demyelination, and gliosis (scarring) with neuronal loss specially in advanced cases. Relative sparing of axons is typical of MS. Lesions of MS typically occur at different times and in different CNS locations (i.e., disseminated in time and space).***1369 New MS lesions begin with ?***Harrison's 18th Ed. 3395*

- A. Astrocytic proliferation
- B. Disruption of blood-brain barrier (BBB)
- C. Perivascular cuffing by inflammatory mononuclear cells
- D. Infiltration of nervous system by B lymphocytes

*New MS lesions begin with perivascular cuffing by inflammatory mononuclear cells, predominantly T cells and macrophages.***1370 "Shadow plaques" refer to ?***Harrison's 18th Ed. 3395*

- A. Astrocytic proliferation (gliotic areas)
- B. Remyelination of surviving naked axons
- C. Aggregates of T and B cells
- D. Any of the above

Surviving oligodendrocytes partially remyelinate surviving naked axons, producing "shadow plaques".

1371 Nerve conduction in myelinated axons occurs in a saltatory manner at a velocity of ?

Harrison's 18th Ed. 3395

- A. ~ 50 meters / second
- B. ~ 70 meters / second
- C. ~ 90 meters / second
- D. ~ 110 meters / second

Nerve conduction in myelinated axons occurs in saltatory manner at a velocity of ~70 m/sec. In unmyelinated nerves, continuous propagation occurs at ~1 m/sec.

1372 Which of the following is best related to pathophysiology of MS ?

Harrison's 18th Ed. 3395 Figure 380-1

- A. Redistribution of potassium channels along naked axon
- B. Redistribution of sodium channels along naked axon
- C. Redistribution of calcium channels along naked axon
- D. Redistribution of chloride channels along naked axon

In MS, due to demyelination, conduction blocks occur. Axons that are normally buried underneath the myelin sheath are exposed. Thereafter, resting axon membrane becomes hyperpolarized due to exposure of voltage-dependent potassium channels. Sodium channels are concentrated at the nodes of Ranvier. With demyelination sodium channels redistribute along the naked axon allowing slow, rather than saltatory, continuous propagation of nerve action potentials through the demyelinated segment.

1373 Risk of developing MS is highest ?

Harrison's 18th Ed. 3396 Table 380-1

- A. If an identical twin has MS
- B. If a sibling has MS
- C. If a parent has MS
- D. If a spouse has MS

Risk of developing MS is highest if an identical twin has MS (1 in 3).

1374 Which of the following is false about multiple sclerosis ?

Harrison's 18th Ed. 3395

- A. Thrice more common in women than men
- B. Age of onset is between 20 and 40 years
- C. Prevalence decreases at higher latitudes
- D. ~10% cases begin <18 years of age

Prevalence rates of MS increase at higher latitudes.

1375 Highest known prevalence for MS is in ?

Harrison's 18th Ed. 3395

- A. Middle east
- B. Orkney Islands
- C. Tasmania
- D. Fiji

Highest known prevalence for MS is in Orkney Islands (Scotland) (250 per 100,000).

1376 Deficiency of which of the following vitamins is associated with an increase in MS risk ?

Harrison's 18th Ed. 3396

- A. A
- B. D
- C. E
- D. C

Vitamin D deficiency is associated with an increase in MS risk. Ongoing deficiency may increase the relapse rate in established MS.

1377 In northern hemisphere, babies born in which month are significantly more likely to develop MS ?

Harrison's 18th Ed. 3396

- A. February
- B. May
- C. September
- D. December

In northern hemisphere, babies born in May are significantly more likely to develop MS than those born in November. This is called "month-of-birth effect". Opposite is true for southern hemisphere.

1378 Which of the following races are inherently at higher risk for MS ?

Harrison's 18th Ed. 3396

- A. Whites
- B. Africans
- C. Asians
- D. All of the above

Whites are inherently at higher risk for MS than Africans or Asians.

1379 Which of the following is the strongest MS susceptibility region in the genome ?

Harrison's 18th Ed. 3396

- A. MHC on chromosome 6
- B. MHC on chromosome 7
- C. MHC on chromosome 8
- D. MHC on chromosome 9

Major histocompatibility complex (MHC) on chromosome 6 is by far the strongest MS susceptibility region in the genome.

1380 Which virus produces demyelinating disease having lesions resembling lesions of MS ?

Harrison's 16th Ed. 2462

- A. Theiler virus
- B. Varicella
- C. Rubella
- D. Epstein-Barr

1381 Which out of the following is the most common initial symptoms of MS ?

Harrison's 18th Ed. 3397 Table 380-2

- A. Paresthesias
- B. Diplopia
- C. Ataxia
- D. Vertigo

1382 Which out of the following is the most common initial symptoms of MS ?

Harrison's 18th Ed. 3397 Table 380-2

- A. Sensory loss
- B. Diplopia
- C. Optic neuritis
- D. Bladder dysfunction

1383 Which of the following is characteristic of MS ?

Harrison's 18th Ed. 3397

- A. Movement-induced muscle spasms

- B. Exercise-induced weakness of limbs
- C. Monocular visual loss
- D. Acquired pendular nystagmus

Exercise-induced weakness of limbs is characteristic of MS. Weakness is of UMN type accompanied by spasticity, hyperreflexia & Babinski signs.

1384 Which of the following is strongly suggestive of MS ?

Harrison's 18th Ed. 3398

- A. Horizontal gaze palsy
- B. Bilateral internuclear ophthalmoplegia (INO)
- C. "One and a half" syndrome
- D. Acquired pendular nystagmus

Bilateral internuclear ophthalmoplegia (INO) is particularly suggestive of MS. Other gaze disturbances include horizontal gaze palsy, "one and a half" syndrome (horizontal gaze palsy + an INO) & acquired pendular nystagmus.

1385 In MS, optic neuritis (ON) is least likely to presents as ?

Harrison's 18th Ed. 3398

- A. Diminished visual acuity
- B. Dimness
- C. Decreased color perception
- D. Complete loss of light perception

Optic neuritis (ON) presents as diminished visual acuity, dimness, or decreased color perception (desaturation) in the central field of vision. Rarely, there is complete loss of light perception.

1386 In MS, which of the following statements is false ?

Harrison's 18th Ed. 3398

- A. Visual symptoms are generally bilateral
- B. Periorbital pain precedes or accompanies visual loss
- C. Afferent pupillary defect is usually present
- D. Uveitis is uncommon

Visual symptoms are generally monocular but may be bilateral. Periorbital pain often precedes or accompanies visual loss. Afferent pupillary defect is usually present. Funduscopic examination may be normal or reveal optic disc swelling (papillitis). Pallor of optic disc (optic atrophy) commonly follows ON. Uveitis is uncommon.

1387 Symptoms of bladder dysfunction are present in what percentage of MS patients ?

Harrison's 18th Ed. 3398

- A. 50 %
- B. 65 %
- C. 75 %
- D. 90 %

Bladder dysfunction is present in >90% of MS patients.

1388 Which of the following about sensory symptoms in MS is false ?

Harrison's 18th Ed. 3398

- A. Paresthesias
- B. Hypesthesia
- C. Sensory level
- D. None of the above

Sensory symptoms in MS include paresthesias, hypesthesia, unpleasant sensations, bandlike sensation of tightness around torso.

1389 Ataxia in MS usually manifests as ?

Harrison's 18th Ed. 3398

- A. Cerebellar tremors

- B. Hyperthyroid tremors
- C. Episodic ataxia
- D. Gait apraxia

Ataxia usually manifests as cerebellar tremors.

1390 Which of the following was once thought to be characteristic of MS ?

Harrison's 18th Ed. 3398

- A. Euphoria
- B. Impaired attention
- C. Memory loss
- D. Slowed information processing

Euphoria (elevated mood) was once thought to be characteristic of MS but is actually uncommon, occurring in <20% of patients.

1391 In MS, fatigue can be exacerbated by ?

Harrison's 18th Ed. 3398

- A. Elevated temperatures
- B. Depression
- C. Sleep disturbances
- D. All of the above

90% of patients of MS experience fatigue which is exacerbated by elevated temperatures, depression, or sleep disturbances.

1392 In MS, facial weakness is characterised by ?

Harrison's 18th Ed. 3398

- A. Resembles idiopathic Bell's palsy
- B. Not associated with ipsilateral loss of taste sensation
- C. Not associated with retroauricular pain
- D. All of the above

Facial weakness due to a MS lesion in pons resembles idiopathic Bell's palsy but is not associated with ipsilateral loss of taste or retroauricular pain.

1393 In MS, 'Uhthoff's symptom' is related to ?

Harrison's 18th Ed. 3398

- A. Facial myokymia
- B. Visual symptoms
- C. Heat sensitivity
- D. Movement

Heat sensitivity refers to neurologic symptoms produced by elevation of body's core temperature. Unilateral visual blurring may occur during a hot shower or with physical exercise (Uhthoff's symptom).

1394 Which of the following is false about Lhermitte's symptom ?

Harrison's 18th Ed. 3398

- A. Electric shock - like sensation
- B. Evoked by neck flexion
- C. Radiates down the back into legs
- D. None of the above

Lhermitte's symptom is an electric shock like sensation, typically induced by flexion of neck, that radiates down the back into legs. Lhermitte's symptom can also occur with other disorders of cervical spinal cord (cervical spondylosis). Vitamin B₁₂ deficiency syndrome and Cisplatin toxicity can also cause it.

1395 At onset, which of the following is the commonest clinical type of MS ?

Harrison's 18th Ed. 3398

- A. Relapsing/remitting MS (RRMS)

- B. Secondary progressive MS (SPMS)
- C. Primary progressive MS (PPMS)
- D. Progressive/relapsing MS (PRMS)

Relapsing/remitting MS (RRMS) accounts for 85% of MS cases at onset.

1396 Secondary progressive MS (SPMS) always begins as ?

Harrison's 18th Ed. 3399

- A. Relapsing/remitting MS (RRMS)
- B. Primary progressive MS (PPMS)
- C. Progressive/relapsing MS (PRMS)
- D. Any of the above

Secondary progressive MS (SPMS) always begins as RRMS.

1397 Which of the following clinical type of MS has a more favorable prognosis ?

Harrison's 18th Ed. 3399

- A. Relapsing/remitting MS (RRMS)
- B. Secondary progressive MS (SPMS)
- C. Primary progressive MS (PPMS)
- D. Progressive/relapsing MS (PRMS)

Relapsing/remitting MS (RRMS) is characterized by discrete attacks that evolve over days to weeks with complete recovery over weeks to months. Between attacks, patients are neurologically stable.

1398 Which of the following does not favour the diagnosis of MS ?

Harrison's 18th Ed. 3399 Figure 380-3

- A. Mild CSF pleocytosis (> 5 cells/ μ L)
- B. CSF protein concentration of > 100 mg/dL
- C. Lesions in the anterior corpus callosum
- D. Dawson's fingers

Pleocytosis of >75 cells/ μ L, presence of polymorphonuclear leukocytes, or a protein concentration of >100 mg/dL in CSF should raise doubts about MS. Lesions in the anterior corpus callosum are frequent in MS and rare in vascular disease. Dawson's fingers refers to lesions as seen in MRI that are oriented perpendicular to ventricular surface, and corresponding to pathologic pattern of perivenous demyelination.

1399 Which of the following is a marker of axonal integrity ?

Harrison's 18th Ed. 3399

- A. Propionyl-CoA carboxylase
- B. Argininosuccinate lyase
- C. N-acetyl aspartate
- D. N-Acetylglutamate synthase

N-acetyl aspartate, which is a marker of axonal integrity. Proton magnetic resonance spectroscopic imaging (MRSI) can quantitate it.

1400 Which of the following is uncommon in MS ?

Harrison's 18th Ed. 3400

- A. Aphasia
- B. Seizures
- C. Chorea
- D. All of the above

Uncommon or rare symptoms in MS are aphasia, parkinsonism, chorea, isolated dementia, severe muscular atrophy, peripheral neuropathy, episodic loss of consciousness, fever, headache, seizures, or coma.

1401 Disorders that can mimic multiple sclerosis are all except ?

Harrison's 18th Ed. 3402 Table 380-4

- A. Vitamin B₁₂ deficiency

- B. Syphilis
- C. Sarcoid
- D. HSV-1 encephalitis

Disorders that can mimic multiple sclerosis are acute disseminated encephalomyelitis (ADEM), Antiphospholipid antibody syndrome (APLA), Behçet's disease, Cerebral autosomal dominant arteriopathy, subcortical infarcts, and leukoencephalopathy (CADASIL), Congenital leukodystrophies (adrenoleukodystrophy, metachromatic leukodystrophy), HIV infection, Ischemic optic neuropathy, Lyme disease, Mitochondrial encephalopathy with lactic acidosis and stroke (MELAS), Neoplasms (lymphoma, glioma, meningioma), Sarcoid, Sjögren's syndrome, Stroke & ischemic cerebrovascular disease, Syphilis, Systemic lupus erythematosus, Tropical spastic paraparesis (HTLV I/II infection), Vascular malformations, Vasculitis, Vitamin B12 deficiency.

1402 Clinical features that have a more favorable prognosis in MS include all except ?

Harrison's 18th Ed. 3401

- A. Optic neuritis or sensory symptoms at onset
- B. Pyramidal symptoms
- C. Women
- D. Age < 40 years at onset

Clinical features that point towards favorable prognosis in MS are ON or sensory symptoms at onset, <2 relapses in 1st year of illness & minimal impairment after 5 years. Those with truncal ataxia, action tremor, pyramidal symptoms or progressive disease are likely to be disabled.

1403 Likelihood of having benign MS is about ?

Harrison's 18th Ed. 3401

- A. 2 %
- B. 5 %
- C. 10 %
- D. 20 %

In benign variant of MS, patients never develop neurologic disability & maintain a benign course. Likelihood of having benign MS is <20%.

1404 Kurtzke Expanded Disability Status Score (EDSS) is used for ?

Harrison's 18th Ed. 3402

- A. Parkinson disease
- B. Multiple sclerosis
- C. Alzheimer's disease
- D. Creutzfeldt-Jakob disease

1405 Most patients with Kurtzke Expanded Disability Status Score (EDSS) scores < 3.5 have ?

Harrison's 18th Ed. 3402

- A. Relapsing/remitting MS (RRMS)
- B. Secondary progressive MS (SPMS)
- C. Primary progressive MS (PPMS)
- D. Progressive/relapsing MS (PRMS)

Kurtzke Expanded Disability Status Score (EDSS) is a measure of neurologic impairment in MS. Most patients with EDSS scores <3.5 have RRMS and are generally not disabled. Patients with EDSS scores >5.5 have progressive MS (SPMS or PPMS), are gait-impaired and occupationally disabled.

1406 Which of the following is used for acute attacks of MS ?

Harrison's 18th Ed. 3402

- A. Glucocorticoids
- B. Mitoxantrone
- C. Glatiramer acetate
- D. All of the above

Glucocorticoids are used to manage first attacks or acute exacerbations of MS.

1407 Disease modifying therapies for RRMS include ?*Harrison's 18th Ed. 3402*

- A. IFN β 1a
- B. Mitoxantrone (MTX)
- C. Glatiramer acetate (GA)
- D. All of the above

Disease-Modifying Therapies for Relapsing Forms of MS (RRMS, SPMS with Exacerbations) include IFN- β -1a, IFN- β -1b, glatiramer acetate & natalizumab, fingolimod, and mitoxantrone. Cladribine awaits FDA approval.

1408 Which of the following drugs is used for patients with progressive disability in MS ?*Harrison's 18th Ed. 3402*

- A. Glucocorticoid
- B. Plasma exchange
- C. Mitoxantrone
- D. Glatiramer acetate

Mitoxantrone is an immune suppressant generally reserved for patients with progressive disability who have failed other treatments. Mitoxantrone should not be used as a first-line agent in either RRMS or relapsing SPMS.

1409 Untreated patients of MS should be followed with ?*Harrison's 18th Ed. 3406*

- A. Objective clinical CNS examination
- B. Evoked Potential testing
- C. Kurtzke Expanded Disability Status Score (EDSS)
- D. Periodic brain MRI scans

Untreated patients are followed closely with periodic brain MRI scans.

1410 Which of the following is the first-line therapy for Relapsing/remitting MS ?*Harrison's 18th Ed. 3405*

- A. IFN β
- B. IV Ig
- C. Mitoxantrone
- D. Natalizumab

Relapsing forms of MS are treated with IFN- β or glatiramer acetate as first-line therapy.

1411 Which of the following is administered by IV infusion ?*Harrison's 18th Ed. 3405*

- A. IFN- β -1a
- B. IFN- β -1b
- C. Glatiramer acetate
- D. Natalizumab

IFN- β -1a (IM), IFN- β -1b (SC), Glatiramer acetate (SC), Natalizumab (IV infusion).

1412 Which of the following is administered orally ?*Harrison's 18th Ed. 3405*

- A. IFN- β -1a
- B. Mitoxantrone
- C. Glatiramer acetate
- D. Fingolimod

1413 Mitoxantrone is indicated for use in ?*Harrison's 18th Ed. 3405*

- A. SPMS

- B. PRMS
- C. Worsening RRMS
- D. All of the above

Mitoxantrone is indicated in SPMS, PRMS, and worsening RRMS.

1414 Worsening RRMS is defined as ?*Harrison's 18th Ed. 3405*

- A. Neurologic status abnormal between MS attacks
- B. Worsening CSF IgG index
- C. MRI lesions >3 mm in diameter
- D. Involvement of more sites of CNS

Worsening RRMS is defined as patients whose neurologic status remains significantly abnormal between MS attacks.

1415 Which of the following therapies is effective in treating PPMS ?*Harrison's 18th Ed. 3406*

- A. Glucocorticoids
- B. IFN β 1a
- C. Glatiramer acetate
- D. None of the above

No currently available therapies have shown any promise for treating PPMS at this time.

1416 Devic's syndrome refers to which of the following ?*Harrison's 18th Ed. 3408*

- A. Acute Disseminated Encephalomyelitis (ADEM)
- B. Isolated dementia
- C. Neuromyelitis optica (NMO)
- D. Mitochondrial encephalopathy

Neuromyelitis optica (NMO) is also called Devic's syndrome.

1417 In neuromyelitis optica, which of the following is involved ?*Harrison's 18th Ed. 3408*

- A. Brainstem
- B. Cerebellum
- C. Cognitive functions
- D. None of the above

In contrast to MS, patients with NMO do not experience brainstem, cerebellar & cognitive involvement, & the brain MRI is typically normal. Over three or more spinal cord segments are involved.

1418 Autoantibody against which of the following is seen in neuromyelitis optica ?*Harrison's 18th Ed. 3408*

- A. Aquaporin-1
- B. Aquaporin-2
- C. Aquaporin-3
- D. Aquaporin-4

A highly specific autoantibody directed against water channel protein aquaporin-4 is seen in >50% patients of NMO. Aquaporin-4 is localized to foot processes of astrocytes in close apposition to endothelial surfaces.

1419 In Marburg's variant of multiple sclerosis, the course of disease is ?*Harrison's 18th Ed. 3408*

- A. Hyperacute
- B. Subacute

- C. Fulminant
- D. Chronic

Acute MS (Marburg's variant) is a fulminant demyelinating process that in some cases progresses inexorably to death within 1–2 years.

- 1420 Which of the following about multiple sclerosis is false ?**
N Engl J Med 2006;354:942-55
- A. Plaque is a chronic inflammatory, demyelinating lesion
 - B. Plaque lesions develop in white matter
 - C. Primary targets are myelin sheath & oligodendrocyte
 - D. Gray matter lesions are known to occur
- 1421 Which of the following about acute lesions of multiple sclerosis is false ?**
N Engl J Med 2006;354:942-55
- A. Indistinct margin, hypercellularity, intense perivascular infiltration, loss of myelin and oligodendrocytes
 - B. Widespread axonal damage, plasma cells, myelin-laden macrophages
 - C. Hypertrophic astrocytes
 - D. Astroglial scarring
- 1422 Most explosive form of acute disseminated encephalomyelitis (ADEM) is called ?**
Harrison's 18th Ed. 3408
- A. Mitochondrial encephalopathy
 - B. Acute hemorrhagic leukoencephalitis
 - C. Tropical spastic paraparesis
 - D. Metachromatic leukodystrophy

Acute hemorrhagic leukoencephalitis is the most explosive form of ADEM. Lesions are vasculitic & hemorrhagic & the clinical course is devastating.

- 1423 Which of the following is false about acute disseminated encephalomyelitis (ADEM) ?**
Harrison's 18th Ed. 3408
- A. Polyphasic course
 - B. Postvaccinal encephalomyelitis
 - C. Postinfectious encephalomyelitis
 - D. Perivenular inflammation & demyelination

ADEM has a monophasic course & is associated with antecedent immunization (postvaccinal encephalomyelitis) or infection (postinfectious encephalo-myelitis). Hallmark of ADEM is presence of widely scattered small foci of perivenular inflammation & demyelination.

- 1424 ADEM can follow infections with all except ?**
Harrison's 18th Ed. 3408
- A. Measles
 - B. Varicella
 - C. Mycoplasma
 - D. Legionella
- 1425 ADEM can follow infections with all except ?**
Harrison's 18th Ed. 3408
- A. Rubella
 - B. Hepatitis B
 - C. Mumps
 - D. Infectious mononucleosis virus

Postvaccinal encephalomyelitis may follow administration of smallpox vaccine & rabies vaccine. Postinfectious encephalomyelitis is associated with infection with measles virus, varicella (chickenpox), rubella, mumps, influenza, parainfluenza, infectious mononucleosis viruses and Mycoplasma.

- 1426 Which CNS antigens correlates with development of ADEM ?**
Harrison's 18th Ed. 3408
- A. Vascular cell adhesion molecule (VCAM)
 - B. Myelin basic protein (MBP)
 - C. Bruton's tyrosine kinase (BTK)
 - D. Stromal-cell derived factor (SDF)

All forms of ADEM result from a cross-reactive immune response to infectious agent or vaccine that triggers an inflammatory demyelinating response. Autoantibodies to MBP and to other myelin antigens have been detected in the CSF from many patients with ADEM.

- 1427 Cerebellar involvement in ADEM is common in infections due to ?**
Harrison's 18th Ed. 3408
- A. Measles
 - B. Varicella
 - C. Mycoplasma
 - D. Mumps

In ADEM due to chickenpox, cerebellar involvement is often conspicuous.

- 1428 ADEM is differentiated from MS by ?**
Harrison's 18th Ed. 3409
- A. Simultaneous onset of disseminated symptoms & signs
 - B. Drowsiness or coma
 - C. Seizures
 - D. All of the above

- 1429 ADEM is differentiated from MS by ?**
Harrison's 18th Ed. 3409
- A. Bilateral involvement of optic nerve
 - B. Complete transverse myelopathy
 - C. Monophasic course
 - D. All of the above

Features that suggest ADEM rather than MS are monophasic course, simultaneous onset of disseminated symptoms & signs, meningismus, drowsiness, coma, seizures, bilateral optic nerve involvement, complete transverse myelopathy.

381 - Meningitis, Encephalitis, Brain Abscess, and Empyema

- 1430 Cerebritis is best related to ?**
Harrison's 18th Ed. 3410
- A. Encephalitis
 - B. Meningitis
 - C. Abscess
 - D. Thrombophlebitis

Focal bacterial, fungal or parasitic infections involving brain tissue are classified as either cerebritis or abscess, depending on the presence or absence of a capsule. When brain tissue is directly injured by a viral infection the disease is referred to as encephalitis.

- 1431 While eliciting Brudzinski's sign which part of body is passively moves ?**
Harrison's 18th Ed. 3410
- A. Hip joint

- B. Knee joint
- C. Neck
- D. Ankle joint

Brudzinski's sign is positive when passive flexion of neck results in spontaneous flexion of hips & knees.

1432 In adults, organism most commonly responsible for community-acquired bacterial meningitis is ?

Harrison's 18th Ed. 3410

- A. N. meningitidis
- B. Streptococcus pneumoniae
- C. Group B streptococci
- D. H. influenzae

Organisms responsible for community-acquired bacterial meningitis are S. pneumoniae (~50%), N. meningitidis (~25%), group B streptococci (~15%), Listeria monocytogenes (~10%) & H. influenzae (<10%).

1433 Individuals with deficiencies of which of the following are highly susceptible to meningococcal infections ?

Harrison's 18th Ed. 3411

- A. Galectin-1
- B. Properdin
- C. Pentraxin
- D. Cathelin

Individuals with deficiencies of any of the complement components, including properdin, are highly susceptible to meningococcal infections.

1434 Which of the following is present in relatively small amounts in normal CSF ?

Harrison's 18th Ed. 3412

- A. White blood cells (WBCs)
- B. Complement proteins
- C. Immunoglobulins
- D. All of the above

Normal CSF contains few white blood cells (WBCs) and relatively small amounts of complement proteins and immunoglobulins.

1435 Raised intracranial pressure in bacterial meningitis is due to ?

Harrison's 18th Ed. 3412

- A. Interstitial edema
- B. Vasogenic edema
- C. Cytotoxic edema
- D. All of the above

The combination of interstitial, vasogenic, and cytotoxic edema leads to raised ICP and coma.

1436 Which of the following is not a feature of classic clinical triad of meningitis ?

Harrison's 18th Ed. 3413

- A. Fever
- B. Headache
- C. Vomiting
- D. Nuchal rigidity

The classic clinical triad of meningitis is fever, headache & nuchal rigidity. Decreased level of consciousness occurs in >75% of patients. Nausea, vomiting & photophobia are also common complaints.

1437 Generalized seizure and status epilepticus in bacterial meningitis may be due to ?

Harrison's 18th Ed. 3413

- A. Hyponatremia
- B. Cerebral anoxia
- C. Toxic effects of antimicrobial agents
- D. All of the above

Generalized seizure activity & status epilepticus in bacterial meningitis may be due to hyponatremia, cerebral anoxia or less commonly, toxic effects of antimicrobial agents (high-dose penicillin).

1438 Over 90% of patients of bacterial meningitis have a CSF opening pressure of ?

Harrison's 18th Ed. 3413

- A. > 100 mm H₂O
- B. > 120 mm H₂O
- C. > 160 mm H₂O
- D. > 180 mm H₂O

More than 90% of patients will have a CSF opening pressure >180 mmH₂O.

1439 Cushing reflex in raised ICP relates to ?

Harrison's 18th Ed. 3413

- A. Bradycardia
- B. Hypertension
- C. Irregular respirations
- D. All of the above

Cushing reflex includes bradycardia, hypertension & irregular respirations.

1440 In bacterial meningitis, CSF / serum glucose ratio is ?

Harrison's 18th Ed. 3414

- A. < 0.4
- B. < 0.5
- C. < 0.6
- D. < 0.8

CSF/serum glucose ratio in bacterial meningitis is <0.4 in ~60% of patients.

1441 CSF glucose concentration is low when CSF/serum glucose ratio is ?

Harrison's 18th Ed. 3414

- A. < 0.4
- B. < 0.5
- C. < 0.6
- D. < 0.8

CSF glucose concentration is low when CSF/serum glucose ratio is <0.6.

1442 CSF / serum glucose ratio of <0.4 is seen in ?

Harrison's 18th Ed. 3414

- A. Fungal meningitis
- B. Tuberculous meningitis
- C. Carcinomatous meningitis
- D. All of the above

Besides bacterial meningitis, CSF/serum glucose ratio <0.4 is also seen in fungal, tuberculous, and carcinomatous meningitis.

1443 Limulus amebocyte lysate assay in CSF is diagnostic of ?*Harrison's 18th Ed. 3414*

- A. Gram-negative bacterial meningitis
- B. Fungal meningitis
- C. Tuberculous meningitis
- D. Carcinomatous meningitis

Limulus amebocyte lysate assay detects gram-negative endotoxin in CSF & is diagnostic of gram-negative bacterial meningitis.

1444 In Rocky Mountain spotted fever (RMSF), skin rash typically begins in ?*Harrison's 18th Ed. 3415*

- A. Face and scalp
- B. Wrists and ankles
- C. Chest and abdomen
- D. Neck

Skin rash in RMSF typically begins in wrist & ankles. It spreads distally & proximally rapidly to involve palms & soles.

1445 Vogt-Koyanagi-Harada syndrome refers to ?*Harrison's 18th Ed. 3415*

- A. Drug-induced hypersensitivity meningitis
- B. Carcinomatous meningitis
- C. Meningitis associated with sarcoid
- D. Uveomeningitic syndromes

Vogt-Koyanagi-Harada syndrome refers to uveomeningitic syndromes.

1446 Which of the following causes a subacutely evolving meningitis ?*Harrison's 18th Ed. 3415*

- A. Mycobacterium tuberculosis
- B. Cryptococcus neoformans
- C. Treponema pallidum
- D. All of the above

Subacutely evolving meningitis is caused by Mycobacterium tuberculosis, Cryptococcus neoformans, Histoplasma capsulatum, Coccidioides immitis and Treponema pallidum.

1447 In bacterial meningitis, the goal is to begin antibiotic therapy within what time of patient's arrival ?*Harrison's 18th Ed. 3415*

- A. 1 hour
- B. 3 hour
- C. 6 hour
- D. 12 hour

In bacterial meningitis, the goal is to begin antibiotic therapy within 60 minutes of patient's arrival in the emergency room.

1448 Which of the following cephalosporin is preferred in CNS infection with P. aeruginosa ?*Harrison's 18th Ed. 3416 Table 381-3*

- A. Ceftriaxone
- B. Cefotaxime
- C. Ceftazidime
- D. None of the above

Meningitis due to P. aeruginosa should be treated with ceftazidime, cefepime, or meropenem.

1449 Close contacts of a patient of meningococcal meningitis should receive chemoprophylaxis with ?*Harrison's 18th Ed. 3416*

- A. Rifampin
- B. Ciprofloxacin
- C. Azithromycin
- D. Any of the above

Close contacts of meningococcal meningitis patient should receive chemoprophylaxis with rifampin, ciprofloxacin, azithromycin or ceftriaxone.

1450 In meningococcal meningitis chemoprophylaxis, adult dose of rifampin is ?*Harrison's 18th Ed. 3416*

- A. 450 mg once a day for 1 days
- B. 450 mg twice a day for 2 days
- C. 600 mg once a day for 1 days
- D. 600 mg twice a day for 2 days

In meningococcal meningitis chemoprophylaxis, rifampin is given as a 2-day regimen of 600 mg every 12 hour for 2 days in adults.

1451 Which antibiotic should be added to the empirical regimen in acute meningitis for coverage of L. monocytogenes ?*Harrison's 18th Ed. 3415*

- A. Ampicillin
- B. Nafcillin
- C. Penicillin G
- D. Metronidazole

Ampicillin should be added to the empirical regimen for coverage of L. monocytogenes.

1452 Which of the following is false about vancomycin therapy in S. pneumoniae meningitis ?*Harrison's 18th Ed. 3416*

- A. Antibiotic of choice if cephalosporin MIC is >1 µg/mL
- B. Rifampin produces synergistic effect to vancomycin
- C. Vancomycin can be given by intraventricular route
- D. None of the above

1453 When should dexamethasone be given in acute bacterial meningitis ?*Harrison's 18th Ed. 3417*

- A. Before antibiotic therapy
- B. Along with antibiotic therapy
- C. After antibiotic therapy
- D. Any of the above

Rationale for giving dexamethasone 20 minutes before antibiotic therapy is that it inhibits production of TNF by macrophages & microglia only if it is administered before these cells are activated by endotoxin.

1454 Benefit of dexamethasone therapy is not significant if started how many hours after antimicrobial therapy ?*Harrison's 18th Ed. 3417*

- A. > 1 hour
- B. > 3 hours
- C. > 6 hours
- D. > 12 hours

Dexamethasone therapy is unlikely to be of significant benefit if started > 6 hours after antimicrobial therapy has been initiated.

1455 Benefits of dexamethasone therapy are most striking in patients with ?

Harrison's 18th Ed. 3417

- A. Gram-negative bacterial meningitis
- B. Pneumococcal meningitis
- C. Meningococcal meningitis
- D. Staphylococcal meningitis

1456 Mortality is higher in meningitis due to ?

Harrison's 18th Ed. 3417

- A. H. influenzae
- B. N. meningitidis
- C. L. monocytogenes
- D. S. pneumoniae

Mortality is 3 - 7% for meningitis caused by H. influenzae, N. meningitidis or group B streptococci. 15% for that due to L. monocytogenes and 20% for S. pneumoniae.

1457 Predictors of increased mortality in bacterial meningitis include ?

Harrison's 18th Ed. 3417

- A. Onset of seizures within 24 hours of admission
- B. CSF glucose concentration of < 40 mg/dL
- C. CSF protein concentration of > 300 mg/dL
- D. All of the above

Risk of death from bacterial meningitis increases with decreased level of consciousness on admission, onset of seizures within 24 hours of admission, signs of increased ICP, young age (infancy) & age >50, presence of shock and/or need for mechanical ventilation, delay in initiation of treatment, CSF glucose concentration <40 mg/dL and CSF protein >300 mg/dL.

1458 Common sequelae of bacterial meningitis include all except ?

Harrison's 18th Ed. 3417

- A. Decreased intellectual function
- B. Seizures
- C. Visual loss
- D. Hearing loss

Common sequelae of bacterial meningitis include decreased intellectual function, memory impairment, seizures, hearing loss & dizziness & gait disturbances.

Viral meningitis

1459 Which of the following viruses has a nonseasonal prevalence in causing viral meningitis ?

Harrison's 18th Ed. 3417

- A. Arboviruses
- B. LCMV
- C. Mumps
- D. HSV

HSV & HIV viral meningitis have no seasonal predominance. Arboviruses & enteroviruses are frequent during summer/early fall. LCMV & mumps viruses cause viral meningitis during winter months.

1460 Which of the following is uncommon in viral meningitis ?

Harrison's 18th Ed. 3417

- A. Fever
- B. Headache
- C. Meningeal irritation
- D. Marked confusion

Viral meningitis presents as fever, headache, meningeal irritation and an inflammatory CSF profile. Fever may be accompanied by malaise, myalgia, anorexia, nausea and vomiting, abdominal pain, and/or diarrhea. Mild degree of lethargy or drowsiness may occur but more profound alterations in consciousness like stupor, coma, or marked confusion, should prompt consideration of alternative diagnoses.

1461 Which of the following is common in viral meningitis ?

Harrison's 18th Ed. 3417

- A. Kernig's and Brudzinski's signs
- B. Headache - frontal or retroorbital
- C. Focal neurological deficits
- D. Seizures

Headache in viral meningitis is usually frontal or retroorbital with photophobia, pain on moving eyes & mild teminal nuchal rigidity. Evidence of severe meningeal irritation, such as Kernig's and Brudzinski's signs, is generally absent. Seizures or other focal neurologic signs or symptoms suggest involvement of the brain parenchyma and do not occur in uncomplicated viral meningitis.

1462 Which of the following viruses is a less common cause of viral meningitis ?

Harrison's 18th Ed. 3419

- A. Enteroviruses
- B. Arboviruses
- C. Adenoviruses
- D. HSV-2

Enteroviruses account for > 85 % of aseptic meningitis cases. Viruses belonging to the Enterovirus genus are members of the family Picornaviridae and include the coxsackieviruses, echoviruses, polioviruses, and human enteroviruses 68 to 71. Adenoviruses rarely cause viral meningitis.

1463 Typical CSF profile in viral meningitis includes all except ?

Harrison's 18th Ed. 3418

- A. Lymphocytic pleocytosis - 25 to 500 cells/ μ L
- B. Normal or slightly elevated protein - 20 to 80 mg/dL
- C. Reduced glucose concentration
- D. Normal or mildly elevated pressure (100 - 350 mm H₂O)

Examination of CSF is the most important laboratory test in the diagnosis of viral meningitis. The typical profile is a lymphocytic pleocytosis (25 to 500 cells/ μ L), a normal or slightly elevated protein concentration (20 to 80 mg/dL), a normal glucose concentration, and a normal or mildly elevated opening pressure (100 to 350 mm H₂O).

1464 PMNs may predominate in CSF of viral meningitis in the first 48 hours of illness in which of the following infections ?

Harrison's 18th Ed. 3418

- A. Echovirus 9
- B. West Nile virus
- C. Mumps
- D. All of the above

PMNs may predominate in the first 48 hours of illness, especially in patients with infections due to echovirus 9, West Nile virus or Eastern equine encephalitis virus, or mumps.

1465 Cell counts of several thousand per microliter are seen in viral meningitis due to which of the following ?

Harrison's 18th Ed. 3418

- A. Echovirus 9
- B. West Nile virus
- C. Mumps
- D. Arboviruses

1466 Cell counts of several thousand per microliter are seen in viral meningitis due to which of the following ?

Harrison's 18th Ed. 3418

- A. Echovirus 9

- B. West Nile virus
- C. Lymphocytic choriomeningitis virus (LCMV)
- D. Arboviruses

Total CSF cell count in viral meningitis is typically 25 to 500/ μ L, although cell counts of several thousand per microliter are occasionally seen, especially with infections due to lymphocytic choriomeningitis virus (LCMV) and mumps virus.

1467 Low CSF glucose concentration is seen in viral meningitis due to which of the following ?

Harrison's 18th Ed. 3418

- A. Echovirus 9
- B. West Nile virus
- C. Lymphocytic choriomeningitis virus (LCMV)
- D. Arboviruses

1468 Low CSF glucose concentration is seen in viral meningitis due to which of the following ?

Harrison's 18th Ed. 3418

- A. CMV
- B. West Nile virus
- C. Mumps
- D. EBV

The CSF glucose concentration is typically normal in viral infections, although it may be decreased in 10 to 30% of cases due to mumps as well as in cases due to LCMV.

1469 In CSF, lymphocytic pleocytosis with low glucose concentration should suggest which of the following ?

Harrison's 18th Ed. 3418

- A. Fungal meningitis
- B. Listerial meningitis
- C. Tuberculous meningitis
- D. All of the above

1470 In CSF, lymphocytic pleocytosis with low glucose concentration should suggest which of the following ?

Harrison's 18th Ed. 3418

- A. Sarcoid
- B. Neoplastic meningitis
- C. Tuberculous meningitis
- D. All of the above

As a rule, a lymphocytic pleocytosis with a low glucose concentration should suggest fungal, listerial, or tuberculous meningitis or noninfectious disorders (e.g., sarcoid, neoplastic meningitis).

1471 Which of the following is the most important method for diagnosing CNS viral infections ?

Harrison's 18th Ed. 3418

- A. Neopterin
- B. β 2-microglobulin
- C. LDH
- D. PCR amplification of viral nucleic acid

Amplification of viral-specific DNA or RNA from CSF using PCR amplification is the single most important method for diagnosing CNS viral infections.

1472 At what temperature should CSF be stored for culture for diagnosis of viral infection (> 24 hours) ?

Harrison's 16th Ed. 2478

- A. - 20 °C

- B. - 40 °C
- C. - 50 °C
- D. - 70 °C

Beyond 24 hours, CSF specimens for viral isolation are stored in a (-)70°C freezer.

1473 Enteroviruses may be found in all except ?

Harrison's 18th Ed. 3419

- A. Feces
- B. Blood
- C. Urine
- D. Throat washings

Enteroviruses & adenoviruses may be found in feces, arboviruses & LCMV in blood, mumps & CMV, in urine and enteroviruses, mumps, and adenoviruses in throat washings.

1474 Serologic studies are a crucial diagnostic tool for which of the following viruses ?

Harrison's 18th Ed. 3418

- A. West Nile virus (WNV)
- B. HSV
- C. VZV
- D. CMV

For West Nile virus (WNV), serologic studies are a crucial diagnostic tool.

1475 Oligoclonal bands in CSF is not found in which of the following conditions ?

Harrison's 18th Ed. 3418

- A. HIV infection
- B. HSV infections
- C. Subacute sclerosing panencephalitis (SSPE)
- D. Progressive rubella panencephalitis

Oligoclonal bands in CSF are not seen with arbovirus, enterovirus, or HSV infections. But, seen in infections with HIV, HTLV type I, VZV, mumps, SSPE & progressive rubella panencephalitis.

1476 Oligoclonal bands are found in which of the following ?

Harrison's 18th Ed. 3418

- A. Multiple sclerosis
- B. Syphilis
- C. Lyme borreliosis
- D. All of the above

Oligoclonal bands are encountered in multiple sclerosis, syphilis & Lyme borreliosis.

1477 'Mollaret's meningitis' is due to ?

Harrison's 18th Ed. 3419

- A. HIV
- B. HSV
- C. EBV
- D. CMV

'Mollaret's meningitis' appear to be due to HSV.

1478 Aseptic meningitis occurring in winter, with a history of exposure to house mice excreta, leukopenia, thrombocytopenia and CSF pleocytosis suggest the diagnosis of which infection ?

Harrison's 18th Ed. 3419

- A. HSV-2 infection
- B. EBV infection

- C. LCMV infection
- D. Mumps

LCMV infection should be considered when aseptic meningitis occurs in late fall or winter, and in individuals with a history of exposure to house mice (*Mus musculus*) excreta, rash, pulmonary infiltrates, alopecia, parotitis, orchitis, or myopericarditis. Laboratory clues to the diagnosis of LCMV include leukopenia, thrombocytopenia, abnormal LFT, marked CSF pleocytosis (>1000 cells/ μ L) and hypoglycorrachia (<30%).

- 1479 **A case of viral meningitis with exanthemata, hand-foot-mouth disease, herpangina, pleurodynia, myopericarditis, and hemorrhagic conjunctivitis suggest the diagnosis of which infection ?**
Harrison's 18th Ed. 3419
- A. HSV-2 infection
- B. EBV infection
- C. LCMV infection
- D. Enterovirus infection

Enteroviruses are the most common cause of viral meningitis. Occur in summer months, especially in children. Physical findings may include exanthemata, hand-foot-mouth disease, herpangina, pleurodynia, myopericarditis, and hemorrhagic conjunctivitis.

- 1480 **A case of viral meningitis occurring in clusters during summer should prompt for infection with ?**
Harrison's 18th Ed. 3419
- A. HSV-2 infection
- B. Arbovirus infection
- C. LCMV infection
- D. Enterovirus infection

Arbovirus infections typically occur in summer months, in both endemic & epidemic form, reflecting transmission through infected insect vectors. Arboviral meningitis should be considered when clusters of meningitis cases occur in a restricted geographic region during the summer or early fall.

- 1481 **A case of viral meningitis complicated by acute cerebellar ataxia should prompt for infection with ?**
Harrison's 17th Ed. 2629
- A. HSV-2 infection
- B. Arbovirus infection
- C. LCMV infection
- D. VZV CNS infection

VZV meningitis should be suspected in the presence of concurrent chickenpox or shingles though up to 40% of VZV meningitis occur in the absence of rash. VZV can produce acute cerebellar ataxia.

- 1482 **A case of viral meningitis along with orchitis, oophoritis, parotitis, pancreatitis should prompt for infection with ?**
Harrison's 18th Ed. 3420
- A. HSV-2 infection
- B. Arbovirus infection
- C. LCMV infection
- D. Mumps infection

Mumps meningitis occurs in late winter or early spring, especially in males. The presence of orchitis, oophoritis, parotitis, pancreatitis, or elevations in serum lipase and amylase are suggestive of the diagnosis. Clinical meningitis occurs in 5% of patients with parotitis, but only 50% of patients with meningitis have associated parotitis. Mumps infection confers lifelong immunity, so a documented history of previous infection excludes this diagnosis.

- 1483 **Acyclovir therapy is of benefit in patients with meningitis caused by ?**
Harrison's 18th Ed. 3420
- A. HSV-1 or -2

- B. Severe EBV infection
- C. Severe VZV infection
- D. All of the above

Oral or intravenous acyclovir may be of benefit in patients with meningitis caused by HSV-1 or -2 and in cases of severe EBV or VZV infection.

- 1484 **"Pleconaril" is efficacious against which of the following infections ?**
Harrison's 18th Ed. 3420
- A. HSV-2 infection
- B. EBV infection
- C. LCMV infection
- D. Enterovirus infection

Pleconaril still an experimental drug has shown efficacy against a variety of enteroviral infections.

Viral Encephalitis

- 1485 **Sporadic cases of encephalitis in immunocompetent adults are mostly caused by ?**
Harrison's 18th Ed. 3421
- A. HSV-1
- B. West Nile virus (WNV)
- C. St. Louis encephalitis virus
- D. LaCrosse virus

Most important viruses causing sporadic cases of encephalitis in immunocompetent adults are HSV-1, VZV and EBV. Epidemics of encephalitis are caused by arboviruses.

- 1486 **Which of the following is a member of Flaviviruses ?**
Harrison's 18th Ed. 3421
- A. Eastern equine encephalitis virus
- B. Western equine encephalitis virus
- C. West Nile virus (WNV)
- D. California encephalitis virus

Epidemics of encephalitis are caused by arboviruses of which there are several groups like Alphaviruses (Eastern equine encephalitis virus, Western equine encephalitis virus), Flaviviruses (WNV, St. Louis encephalitis virus, Powassan virus), and Bunyaviruses (California encephalitis virus serogroup, LaCrosse virus).

- 1487 **Viral "hemorrhagic" encephalitis can be seen in ?**
Harrison's 18th Ed. 3421
- A. HSV
- B. Colorado tick fever virus
- C. California encephalitis virus
- D. All of the above

~20% of patients with encephalitis have RBC's (>500/ μ L) in CSF tap (hemorrhagic encephalitis) which is also seen with HSV, Colorado tick fever virus and California encephalitis virus.

- 1488 **Which of the following seizure type occurs in a case of severe viral encephalitis ?**
Harrison's 18th Ed. 3421
- A. Absence (petit mal)
- B. Tonic-clonic (grand mal)
- C. Myoclonic
- D. Any of the above

Virtually every possible type of focal neurologic disturbance can occur in viral encephalitis.

1489 Which of the following focal neurological findings is commonly encountered in viral encephalitis ?

Harrison's 18th Ed. 3421

- A. Aphasia
- B. Ataxia
- C. Hemiparesis
- D. All of the above

Most common focal findings in viral encephalitis are aphasia, ataxia, hemiparesis, involuntary movements & cranial nerve deficits.

1490 "Atypical lymphocytes" in CSF of viral encephalitis are commonly seen in ?

Harrison's 18th Ed. 3421

- A. EBV
- B. CMV
- C. HSV
- D. Enteroviruses

Atypical lymphocytes in CSF may be seen in EBV infection and less commonly with other viruses like CMV, HSV and enteroviruses.

1491 CSF PCR is most sensitive for which of the following viruses causing viral encephalitis ?

Harrison's 18th Ed. 3421

- A. WNV
- B. HSV
- C. Enterovirus
- D. VZV

Sensitivity is ~98% & specificity is ~94% of CSF HSV PCR.

1492 Presence in CSF of which class of antibody against WNV indicates WNV encephalitis ?

Harrison's 18th Ed. 3422

- A. IgA
- B. IgG
- C. IgM
- D. IgE

Demonstration of WNV intrathecally synthesised IgM antibodies is diagnostic of WNV encephalitis. They do not cross blood-brain barrier.

1493 Which of the following about HSV-1 encephalitis is false ?

Harrison's 18th Ed. 3422, Table 381-5

- A. Focal findings in MRI
- B. Invariably negative CSF cultures
- C. Most sensitive CSF HSV PCR
- D. None of the above

Focal findings in encephalitis raises the possibility of HSV encephalitis. Cultures are invariably negative in cases of HSV-1 encephalitis. CSF HSV PCR has a sensitivity of ~98%.

1494 In MRI, which cortical lobe of brain is most affected in HSV encephalitis ?

Harrison's 18th Ed. 3422

- A. Frontal
- B. Temporal
- C. Parietal
- D. Occipital

~10% of patients with PCR-documented HSV encephalitis have normal MRI, although ~90% will have abnormalities in the temporal lobe.

1495 In MRI of viral encephalitis, abnormalities involving deep brain structures like thalamus, basal ganglia, and brainstem rather than cortex indicate infection with which of the following viruses ?

Harrison's 18th Ed. 3422

- A. HSV
- B. VZV
- C. WNV
- D. All of the above

MRI abnormalities of patients with WNV encephalitis involve deep brain structures like thalamus, basal ganglia & brainstem rather than cortex. Presentation is therefore with prominent movement disorders (tremor, myoclonus) or Parkinsonism. Patients with WNV infection can also present with acute poliomyelitis-like areflexic paralysis.

1496 In MRI of viral encephalitis, areas of hemorrhagic infarction reflect infection with which of the following viruses ?

Harrison's 18th Ed. 3423

- A. HSV
- B. VZV
- C. WNV
- D. All of the above

Patients with VZV encephalitis show areas of hemorrhagic infarction pointing towards a CNS vasculopathy rather than a true encephalitis.

1497 Which of the following bacterial infection most commonly mimic viral encephalitis ?

Harrison's 18th Ed. 3423

- A. Listeria
- B. Bartonella
- C. Mycoplasma
- D. Leptospira

Bartonella infection is the most common bacterial infection mimicking viral encephalitis.

1498 In viral encephalitis, infection with which of the following can present as acute ascending paralysis resembling Guillain-Barre' syndrome ?

Harrison's 17th Ed. 2632

- A. HIV infection
- B. Rabies
- C. WNV
- D. All of the above

Acute ascending paralysis resembling Guillain-Barre' syndrome but associated with CSF pleocytosis can occur with HIV infection, rabies, and WNV infection.

1499 Abnormalities in MRI are found in which of the following regions of the brain in viral encephalitis caused by rabies ?

Harrison's 18th Ed. 3422

- A. Brainstem
- B. Hippocampus
- C. Hypothalamus
- D. All of the above

In rabies, CSF lymphocytic pleocytosis with areas of increased T2 signal abnormality in brainstem, hippocampus & hypothalamus are seen.

1500 PCR amplification of viral nucleic acid for diagnosis of viral encephalitis caused by rabies can be done from ?

Harrison's 18th Ed. 3422

- A. CSF
- B. Saliva
- C. Tears
- D. All of the above

PCR amplification of viral nucleic acid from CSF and saliva or tears may also enable diagnosis.

1501 Enzyme in HSV, VZV, and EBV that phosphorylates acyclovir to produce acyclovir-5' monophosphate is ?

Harrison's 18th Ed. 3424

- A. 2'-deoxyguanosine
- B. 3'-deoxyguanosine
- C. Deoxypyrimidine kinase
- D. Pyrimidine kinase

HSV, VZV, & EBV encode enzyme, deoxypyrimidine (thymidine) kinase, that phosphorylates acyclovir to produce acyclovir-5'-monophosphate.

1502 Which of the following metabolite of acyclovir acts as an antiviral agent by inhibiting viral DNA polymerase ?

Harrison's 18th Ed. 3424

- A. Monophosphate
- B. Biphosphate
- C. Triphosphate
- D. Any of the above

Infected host cell enzymes phosphorylate acyclovir-5'-monophosphate to form a triphosphate derivative which acts as an antiviral agent by inhibiting viral DNA polymerase & by causing premature termination of nascent viral DNA chains.

1503 In adults suffering from HSV encephalitis, duration of intravenous acyclovir therapy should be for a minimum period of ?

Harrison's 18th Ed. 3424

- A. 3 days
- B. 7 days
- C. 10 days
- D. 14 days

1504 In neonates suffering from HSV encephalitis, duration of intravenous acyclovir therapy should be for a minimum period of ?

Harrison's 18th Ed. 3424

- A. 5 days
- B. 10 days
- C. 14 days
- D. 21 days

Adults should receive a dose of 10 mg/kg of acyclovir IV 8 hourly (30 mg/kg/day) for at least 14 days. Neonates with HSV encephalitis receive 20 mg/kg of acyclovir 8 hourly (60 mg/kg/day) for at least 21 days.

1505 Which of the following is not a side effect of IV acyclovir ?

Harrison's 18th Ed. 3424

- A. Hemolysis
- B. Elevations in BUN & creatinine
- C. Thrombocytopenia
- D. Neurotoxicity

Complications of acyclovir therapy are elevations in BUN & creatinine levels (5%), thrombocytopenia (6%), GI toxicity (7%) & neurotoxicity (lethargy, obtundation, disorientation, confusion, agitation, hallucinations, tremors, seizures) (1%). Hemolysis, with resulting anemia, is a major side effect of IV ribavirin therapy.

1506 Which of the following drug is effective in CMV-related CNS infections ?

Harrison's 18th Ed. 3425

- A. Ganciclovir
- B. Foscarnet
- C. Cidofovir
- D. All of the above

Ganciclovir & foscarnet (often used in combination) are effective in CMV-related CNS infections. Cidofovir may provide an alternative in patients who fail to respond to ganciclovir and foscarnet.

1507 Which of the following drugs is useful for treatment of WNV encephalitis ?

Harrison's 18th Ed. 3425

- A. Ganciclovir
- B. Foscarnet
- C. Cidofovir
- D. None of the above

1508 Incidence & severity of sequelae in patients surviving viral encephalitis is more in infections with ?

Harrison's 18th Ed. 3425

- A. Eastern equine encephalitis virus
- B. EBV
- C. California encephalitis virus
- D. Venezuelan equine encephalitis virus

In Eastern equine encephalitis virus infection, ~80% of survivors have severe neurologic sequelae. Severe sequelae are unusual in EBV, California & Venezuelan equine encephalitis.

1509 Incidence & severity of sequelae of viral encephalitis depends on which of the following ?

Harrison's 18th Ed. 3425

- A. Age of patient
- B. Level of consciousness at time of initiation of therapy
- C. Amount of HSV DNA in CSF at time of presentation
- D. All of the above

Incidence & severity of sequelae are directly related to age of patient & level of consciousness at initiation of therapy. Clinical outcome following treatment correlates with amount of HSV DNA in CSF at presentation.

1510 Most common pathogen causing fungal meningitis is ?

Harrison's 18th Ed. 3425

- A. *Coccidioides immitis*
- B. *Histoplasma capsulatum*
- C. *Cryptococcus neoformans*
- D. *Candida*

The most common pathogen causing fungal meningitis is *C. neoformans*.

1511 Which of the following cranial nerve is most frequently involved in T. pallidum invasion of CNS ?

Harrison's 17th Ed. 2634

- A. II
- B. III
- C. VII
- D. XII

Cranial nerves VII and VIII are most frequently involved in syphilis.

1512 Negative result of which of the following does not rule out neurosyphilis ?

Harrison's 17th Ed. 2634

- A. CSF VDRL
- B. CSF FTA-ABS
- C. MHA-TP
- D. All of the above

A negative CSF VDRL does not rule out neurosyphilis. A negative CSF FTA-ABS or MHA-TP rules out neurosyphilis.

1513 In tuberculous meningitis, which sample of CSF is best for detecting acid-fast bacilli (AFB) ?

Harrison's 17th Ed. 2634

- A. First tube
- B. Middle tube
- C. Last tube
- D. Any of the above

In TBM, last tube of CSF collected at LP is the best tube to send for a smear for AFB. If there is a pellicle in CSF or a cobweb-like clot on surface of fluid, AFB is demonstrated in smear of clot / pellicle.

1514 In progressive multifocal leukoencephalopathy, which of the following is not involved ?

Harrison's 18th Ed. 3427

- A. Frontal cortex
- B. Cerebellum
- C. Midbrain
- D. Spinal cord

In PML, multifocal areas of demyelination distributed throughout the brain but sparing spinal cord and optic nerves are seen.

1515 Which of the following is false about progressive multifocal leukoencephalopathy ?

Harrison's 18th Ed. 3427

- A. Occurs in immunosuppressed population
- B. Only known manifestation of JC virus infection
- C. Late manifestation of AIDS
- D. None of the above

1516 Which of the following is useful for the diagnosis of progressive multifocal leukoencephalopathy ?

Harrison's 18th Ed. 3427

- A. EEG
- B. CT scan of brain
- C. Positive CSF PCR for JCV DNA
- D. Serologic studies for JC virus

Positive CSF PCR for JCV DNA with typical MRI lesions in appropriate clinical setting is diagnostic of PML.

1517 Typical visual deficit seen in progressive multifocal leukoencephalopathy is ?

Harrison's 18th Ed. 3427

- A. Achromatopia
- B. Homonymous hemianopia
- C. Cortical blindness
- D. Amaurosis fugax

Patients of progressive multifocal leukoencephalopathy present with visual deficits, typically homonymous hemianopia.

1518 Subacute sclerosing panencephalitis occurs after a latent interval of how many years after measles infection ?

Harrison's 18th Ed. 3428

- A. 1 - 2 years
- B. 2 - 4 years
- C. 4 - 6 years
- D. 6 - 8 years

SSPE occurs after a latent interval of 6 - 8 years after measles infection.

1519 Which of the following is not a manifestation of subacute sclerosing panencephalitis ?

Harrison's 18th Ed. 3428

- A. Fever and headache
- B. Progressive intellectual deterioration
- C. Focal and/or generalized seizures
- D. Ataxia

Signs of a CNS viral infection - fever & headache do not occur in SSPE.

1520 Which of the following diagnostic modalities are useful in SSPE ?

Harrison's 18th Ed. 3428

- A. EEG
- B. CSF
- C. MRI
- D. All of the above

1521 CSF finding in SSPE is ?

Harrison's 18th Ed. 3428

- A. Acellular
- B. Elevated gamma globulin level
- C. Elevated CSF antimeasles antibody level
- D. All of the above

In SSPE, CSF is acellular with markedly elevated gamma globulin level (>20% of total CSF protein). CSF antimeasles antibody levels are invariably elevated & oligoclonal antimeasles antibodies are present.

1522 Which of the following drugs is used in the treatment of SSPE ?

Harrison's 18th Ed. 3428

- A. Acyclovir
- B. Isoprinosine
- C. Cytarabine
- D. Foscarnet

Isoprinosine (100 mg/kg/day), alone or in combination with intrathecal or intraventricular α -interferon prolongs survival with clinical improvement.

1523 Which of the following is true for the capsule of a brain abscess ?

Harrison's 18th Ed. 3428

- A. Fibrous
- B. Vascularized
- C. No capsule
- D. Any of the above

Brain abscess is a focal, suppurative infection within brain parenchyma, typically surrounded by a vascularized capsule. Term cerebritis refers to describe a nonencapsulated brain abscess.

1524 In immunocompetent individuals the most common pathogen that causes brain abscess is ?

Harrison's 18th Ed. 3428

- A. Streptococcus
- B. Klebsiella
- C. Staphylococcus
- D. E. coli

1525 In immunocompromised hosts the most common pathogen that causes brain abscess is ?

Harrison's 18th Ed. 3428

- A. Taenia solium
- B. Mycobacterium tuberculosis
- C. Nocardia
- D. E. coli

1526 Which of the following is false about hematogenous brain abscesses ?

Harrison's 18th Ed. 3429

- A. At the junction of gray & white matter
- B. Predilection for MCA territory
- C. Multiple
- D. Encapsulated

Hematogenous abscesses are often poorly encapsulated.

1527 Most common symptom of brain abscess is ?

Harrison's 18th Ed. 3429

- A. Headache
- B. Fever
- C. Seizure
- D. Focal neurologic deficit

Most common symptom in patients with a brain abscess is headache.

1528 When should a lumbar puncture performed in patients suspected of brain abscess ?

Harrison's 18th Ed. 3429

- A. As early as possible
- B. On day 3
- C. On day 10
- D. Should not be performed

LP should not be performed in those with known or suspected focal intracranial infections (abscess / empyema) as CSF analysis contributes nothing to diagnosis or therapy, & LP increases the risk of herniation.

1529 Conditions that can cause headache, fever, focal neurologic signs, and seizure activity include ?

Harrison's 18th Ed. 3429

- A. Bacterial meningitis
- B. Superior sagittal sinus thrombosis
- C. Acute disseminated encephalomyelitis
- D. All of the above

Conditions that can cause headache, fever, focal neurologic signs & seizures are brain abscess, subdural empyema, bacterial meningitis, viral meningoencephalitis, superior sagittal sinus thrombosis & acute disseminated encephalomyelitis.

1530 Anticonvulsant therapy is continued for at least how many months after resolution of brain abscess ?

Harrison's 18th Ed. 3429

- A. 3
- B. 6
- C. 9
- D. 12

Anticonvulsant therapy is continued for at least 3 months after resolution of the brain abscess.

1531 Most common parasitic disease of the CNS worldwide is ?

Harrison's 17th Ed. 2637

- A. Neurocysticercosis
- B. Toxoplasmosis
- C. Schistosomiasis
- D. Amebiasis

Neurocysticercosis is the most common parasitic disease of the CNS worldwide.

1532 Most common manifestation of neurocysticercosis is ?

Harrison's 17th Ed. 2637

- A. New-onset partial seizures
- B. New-onset generalized seizures
- C. Focal neurologic deficit
- D. Headache

Most common manifestation of neurocysticercosis is new-onset partial seizures with or without secondary generalization.

1533 Which of the following findings on neuroimaging calls for treatment with anticysticidal drugs ?

Harrison's 17th Ed. 2638

- A. Cysticerci appearing as cystic lesions in brain
- B. Cysticerci appearing as enhancing lesions in brain
- C. Cysticerci appearing as enhancing lesions in subarachnoid space
- D. All of the above

Cysticerci appearing as cystic lesions or as enhancing lesions in the brain parenchyma or in the subarachnoid space at the convexity of the cerebral hemispheres should be treated with anticysticidal therapy.

1534 The superior sagittal sinus drains into ?

Harrison's 18th Ed. 3433

- A. Transverse sinus
- B. Sigmoid sinus
- C. Internal jugular vein
- D. Cavernous sinus

Superior sagittal sinus drains into the transverse sinuses which becomes sigmoid sinus before draining into internal jugular vein.

1535 Headache & earache are the most frequent symptoms of ?

Harrison's 18th Ed. 3434

- A. Transverse sinus thrombosis
- B. Internal jugular vein thrombosis
- C. Superior sagittal sinus thrombosis
- D. Cavernous sinus thrombosis

Headache and earache are the most frequent symptoms of transverse sinus thrombosis.

1536 Gradinego's syndrome is due to thrombosis in which of the following intracranial sinuses ?

Harrison's 18th Ed. 3434

- A. Transverse sinus
- B. Sigmoid sinus
- C. Internal jugular vein
- D. Cavernous sinus

Transverse sinus thrombosis may present with otitis media, sixth nerve palsy & retroorbital or facial pain (Gradinego's syndrome).

1537 Which of the following does not pass through the cavernous sinus ?

Harrison's 18th Ed. 3434

- A. III, IV & VI cranial nerves
- B. Ophthalmic & maxillary branches of V cranial nerve
- C. Middle cerebral artery
- D. Internal carotid artery

III, IV & VI and ophthalmic & maxillary branches of V cranial nerve, along with internal carotid artery pass through the cavernous sinus.

1538 Retroorbital pain is a feature of ?

Harrison's 18th Ed. 3434

- A. Viral meningitis
- B. Transverse sinus thrombosis
- C. Cavernous sinus thrombosis
- D. All of the above

Headache of viral meningitis is usually frontal or retroorbital and is often associated with photophobia & pain on eye movement.

1539 Chronic meningitis is diagnosed when ?

Harrison's 18th Ed. 3435

- A. > 4 weeks duration
- B. Persistent CSF WBC count > 5/ μ L
- C. Chronic & persistent or recurrent & discrete headache
- D. All of the above

1540 Which of the following is best related to resorbption of CSF ?

Harrison's 18th Ed. 3435

- A. Choroid plexus
- B. Arachnoid villi
- C. Virchow-Robin spaces
- D. All of the above

CSF is resorbed by arachnoid villi projecting into superior sagittal sinus. Virchow-Robin spaces are arachnoid cuffs surrounding blood vessels that penetrate brain tissue.

1541 Recurrent meningitis is a feature of all except ?

Harrison's 18th Ed. 3439, Table 382-3

- A. Vogt-Koyanagi-Harada syndrome
- B. Behçet's syndrome
- C. Wegener's granulomatosis
- D. Mollaret's meningitis

1542 Recurrent meningitis is a feature of ?

Harrison's 18th Ed. 3439, Table 382-3

- A. Neurocysticercosis
- B. Drug hypersensitivity
- C. Syphilis

D. Mumps

Exposure to ibuprofen, sulfonamides, isoniazid, tolmetin, ciprofloxacin, phenazopyridine lead to recurrent episodes with recurrent exposure. Improvement occurs after discontinuation of drug.

1543 Uveitis is a feature of ?

Harrison's 18th Ed. 3438

- A. Vogt-Koyanagi-Harada syndrome
- B. Sarcoid
- C. CNS lymphoma
- D. All of the above

Uveitis is a feature of Vogt-Koyanagi-Harada syndrome, sarcoid or CNS lymphoma.

1544 Iridocyclitis is a feature of ?

Harrison's 18th Ed. 3438

- A. Systemic lupus erythematosus
- B. CNS sarcoidosis
- C. Wegener's granulomatosis
- D. Behçet's syndrome

Iridocyclitis is a feature of Behçet's syndrome.

1545 Which of the following is a feature of Behçet's syndrome ?

Harrison's 18th Ed. 3438

- A. Aphthous oral lesions
- B. Genital ulcers
- C. Hypopyon
- D. All of the above

Aphthous oral lesions, genital ulcers and hypopyon suggest Behçet's syndrome.

1546 Fatal levels of raised ICP can occur without enlarged ventricles in ?

Harrison's 18th Ed. 3438

- A. Lyme disease
- B. CNS sarcoidosis
- C. Cryptococcal meningitis
- D. Chronic benign lymphocytic meningitis

In cryptococcal meningitis, fatal levels of raised ICP can occur without enlarged ventricles.

1547 Anti-Ro / SSA positivity is associated with ?

Harrison's 17th Ed. 2108

- A. Sensorineural hearing loss
- B. Raynaud's phenomenon
- C. Congenital heart block
- D. All of the above

Congenital heart block in newborn due to damage to developing conducting system of heart results from transfer of anti-Ro antibody from mother to child.

1548 Most useful empirical therapy for chronic meningitis is ?

Harrison's 18th Ed. 3440

- A. Antituberculous therapy
- B. Antifungal medication
- C. Glucocorticoids
- D. Ventricular-peritoneal shunt

Most useful empirical therapy for chronic meningitis is administration of glucocorticoids rather than antituberculous therapy.

383 - Prion Diseases

1549 Scrapie agent is synonym of ?

Harrison's 18th Ed. 3442 Table 383-1

- A. Amyloid
- B. Prion
- C. Myelin
- D. None of the above

Prions cause scrapie in sheep & goats & Creutzfeldt-Jakob disease in humans.

1550 Which of the following about prions is false ?

Harrison's 18th Ed. 3442

- A. Infectious proteins
- B. Cause degeneration of CNS
- C. Lacks nucleic acid
- D. None of the above

1551 The fundamental event underlying prion diseases is ?

Harrison's 18th Ed. 3441

- A. α -to- β structural transition in PrP
- B. α -to- β structural transition in PrP^{Sc}
- C. α -to- γ structural transition in PrP
- D. α -to- γ structural transition in PrP^{Sc}

α -to- β structural transition in prion protein (PrP^C) is the fundamental event underlying prion diseases

1552 Prion diseases may manifest as ?

Harrison's 18th Ed. 3441

- A. Infectious disorders
- B. Genetic disorders
- C. Sporadic disorders
- D. All of the above

Prion diseases manifest as infectious, genetic & sporadic disorders. No other single etiology illness present with such wide spectrum clinical manifestations.

1553 Disease causing isoform of prion is ?

Harrison's 18th Ed. 3441

- A. PrP^C
- B. PrP^D
- C. PrP^{Sc}
- D. PrP^{Sd}

Prions reproduce by binding to normal, cellular isoform of prion protein (PrP^C) & stimulating conversion of PrP^C into disease-causing isoform (PrP^{Sc}).

1554 Which of the following statements about prions is false ?

Harrison's 18th Ed. 3441, 3445, 3446

- A. Devoid of nucleic acid
- B. Prion diseases result from accumulation of PrP^{Sc}
- C. Pathologic hallmarks of CJD are spongiform degeneration and astrocytic gliosis
- D. CSF is nearly always abnormal in CJD

In CJD, CSF is nearly always normal but may show protein elevation & rarely mild pleocytosis.

1555 Which of the following is the precursor of PrP^{Sc} ?

Harrison's 18th Ed. 3441 Table 383-1

- A. PrP 27-30
- B. PrP^C
- C. PrP^D
- D. PRNP

PrP^C is the precursor of PrP^{Sc}

1556 In humans, PrP gene (PRNP) is located on ?

Harrison's 18th Ed. 3443 & Table 383-1

- A. Short arm of chromosome 12
- B. Short arm of chromosome 14
- C. Short arm of chromosome 16
- D. Short arm of chromosome 20

In humans, PrP gene is designated PRNP and is located on the short arm of chromosome 20.

1557 Which of the following about prions is false ?

Harrison's 18th Ed. 3442 Table 383-1

- A. Prions reproduce by binding to PrP^C
- B. PrP^C is rich in α helix & has little β structure
- C. PrP^{Sc} has less α helix & high amount of β structure
- D. PrP 27-30 is a fragment of PrP^C

PrP 27-30 is a fragment of PrP^{Sc}, generated by truncation of the NH₂-terminus by limited digestion with proteinase K. PrP 27-30 retains prion infectivity and polymerizes into amyloid.

1558 Which is the most common prion disorder in humans ?

Harrison's 18th Ed. 3441

- A. Sporadic CJD (sCJD)
- B. Familial CJD (fCJD)
- C. Gerstmann-Straussler-Scheinker disease (GSS)
- D. Fatal familial insomnia (FFI)

Sporadic CJD is the most common prion disorder in humans (~85%).

1559 Inherited prion disease caused by mutations in PrP gene is ?

Harrison's 18th Ed. 3441

- A. Familial CJD (fCJD)
- B. Gerstmann-Straussler-Scheinker disease (GSS)
- C. Fatal familial insomnia (FFI)
- D. All of the above

fCJD, GSS disease & FFI are dominantly inherited prion diseases caused by mutations in PrP gene.

1560 Iatrogenic CJD can be caused by ?

Harrison's 18th Ed. 3444

- A. Corneal transplantation
- B. Contaminated EEG electrode implantation
- C. Implantation of duramater grafts
- D. All of the above

Accidental transmission of CJD to humans can occur with corneal transplantation, contaminated EEG electrode implantation, duramater / pericardium graft, contaminated human growth hormone (hGH) and human pituitary gonadotropin.

1561 Pathologic hallmarks of Creutzfeldt-Jakob disease (CJD) is ?

Harrison's 18th Ed. 3445

- A. Spongiform degeneration
- B. Astrocytic gliosis
- C. Lack of inflammatory response

D. All of the above

Pathologic hallmarks of CJD are spongiform degeneration, astrocytic gliosis & lack of inflammatory response.

1562 “Florid plaques” is characteristic feature of ?

Harrison's 18th Ed. 3445

- A. sCJD (Creutzfeldt-Jakob disease)
- B. fCJD
- C. vCJD
- D. iCJD

Presence of “florid plaques” is a characteristic feature of vCJD. These are composed of a central core of PrP amyloid, surrounded by vacuoles in a pattern suggesting petals on a flower.

1563 Dementia with myoclonus is seen in ?

Harrison's 18th Ed. 3445

- A. Alzheimer's disease (AD)
- B. Unverricht-Lundborg disease
- C. Creutzfeldt-Jakob disease (CJD)
- D. All of the above

Dementia with myoclonus can be due to Alzheimer's disease (AD), dementia with Lewy bodies, cryptococcal encephalitis, or the myoclonic epilepsy disorder Unverricht-Lundborg disease.

1564 Which of the following about myoclonus in CJD is false ?

Harrison's 18th Ed. 3445

- A. Persists during sleep
- B. Elicited by loud sounds
- C. Elicited by bright lights
- D. None of the above

In CJD, myoclonus is neither specific nor confined to CJD and tends to occur later in the course. Myoclonus persists during sleep, is elicited by loud sounds or bright lights.

1565 Most patients with CJD survive for what length of time after onset of clinical signs & symptoms ?

Harrison's 18th Ed. 3445

- A. 6 - 12 months
- B. 12 - 24 months
- C. 24 - 48 months
- D. 48 - 60 months

Most patients with CJD survive for 6 - 12 months after the onset of clinical signs and symptoms.

1566 Clinical abnormalities in CJD involve ?

Harrison's 18th Ed. 3445

- A. CNS
- B. PNS
- C. ANS
- D. All of the above

Clinical abnormalities in CJD are confined to the CNS.

1567 Which of the following is a finding in CJD ?

Harrison's 18th Ed. 3445

- A. Fever
- B. Leukocytosis
- C. Pleocytosis in CSF
- D. None of the above

Fever, elevated ESR, leukocytosis, or pleocytosis in CSF point towards another etiology to explain patient's CNS dysfunction.

1568 Ataxia is a prominent & presenting feature in ?

Harrison's 18th Ed. 3445

- A. Familial CJD (fCJD)
- B. Gerstmann-Straussler-Scheinker disease (GSS)
- C. Fatal familial insomnia (FFI)
- D. sCJD

Ataxia is a prominent & presenting feature in GSS disease, with dementia occurring late in the disease course. Early ataxia & visual hallucinations with a prominent psychiatric prodrome point towards vCJD.

1569 Insomnia & dysautonomia are a feature of ?

Harrison's 18th Ed. 3445

- A. Familial CJD (fCJD)
- B. Gerstmann-Straussler-Scheinker disease (GSS)
- C. Fatal familial insomnia (FFI)
- D. vCJD

FFI is characterized by insomnia & dysautonomia. Dementia occurs in terminal phase of illness.

1570 Which of the following is false for Hashimoto's encephalopathy ?

Harrison's 18th Ed. 3445

- A. Subacute progressive encephalopathy
- B. Tonic-clonic seizures
- C. Periodic triphasic complexes on EEG
- D. Fluctuations in severity

Myoclonus & periodic triphasic complexes on EEG, high titers of antithyroglobulin or antithyroid peroxidase (antimicrosomal) antibodies and improvement with glucocorticoid therapy point towards Hashimoto's encephalopathy.

1571 Sterilization for Creutzfeldt-Jakob disease (CJD) contaminated materials is done by ?

Harrison's 18th Ed. 3446

- A. HCl
- B. NaOH
- C. NaHCO₃
- D. All of the above

Autoclaving at 134°C for 5 hours or treatment with 2 N NaOH for several hours is recommended for sterilization of prions.

1572 Stress protein 14-3-3 is elevated in the CSF of ?

Harrison's 16th Ed. 2500

- A. Herpes simplex virus encephalitis
- B. Multi-infarct dementia
- C. Stroke
- D. All of the above

1573 Stress protein 14-3-3 is elevated in the CSF of all except ?

Harrison's 16th Ed. 2500

- A. Herpes simplex virus encephalitis
- B. Multi-infarct dementia
- C. AD
- D. CJD

384 - Peripheral Neuropathy

1574 Peripheral nerves are composed of which of the following elements ?

Harrison's 18th Ed. 3448

- A. Sensory
- B. Motor
- C. Autonomic
- D. All of the above

Peripheral nerves are composed of sensory, motor and autonomic elements.

1575 Which of the following is not a major class of nerves ?

Harrison's 18th Ed. 3448

- A. Large myelinated
- B. Large unmyelinated
- C. Small myelinated
- D. Small unmyelinated

Nerves can be subdivided into three major classes: large myelinated, small myelinated, and small unmyelinated.

1576 Motor axons conduct impulses at the speed of about ?

Harrison's 18th Ed. 3448

- A. 25 m/sec
- B. 50 m/sec
- C. 75 m/sec
- D. 100 m/sec

Motor axons are usually large myelinated fibers & conduct impulses at ~ 50 m/sec.

1577 Sensory fibers are of which type ?

Harrison's 18th Ed. 3448

- A. Large myelinated
- B. Small myelinated
- C. Small unmyelinated
- D. Any of the above

Sensory fibers may be any of the three types namely, large myelinated, small myelinated or small unmyelinated.

1578 Proprioception & vibratory sensation are conducted to the brain by ?

Harrison's 18th Ed. 3448

- A. Large-diameter sensory fibers
- B. Smaller-diameter myelinated fibers
- C. Smaller-diameter unmyelinated fibers
- D. All of the above

Large-diameter sensory fibers conduct proprioception and vibratory sensation to the brain, while the smaller-diameter myelinated and unmyelinated fibers transmit pain and temperature sensation.

1579 Which of the following is a possibility in symmetric proximal and distal weakness with sensory loss ?

Harrison's 18th Ed. 3451 Table 384-2

- A. Chronic inflammatory demyelinating polyneuropathy (CIDP)
- B. Charcot-Marie-Tooth disease
- C. Spinal muscular atrophy (SMA)
- D. Diabetes mellitus

In the scenario of symmetric proximal and distal weakness with sensory loss, inflammatory demyelinating polyneuropathy (GBS and CIDP) are a possibility.

1580 Which of the following is a possibility in symmetric distal sensory loss with or without distal weakness ?

Harrison's 18th Ed. 3451 Table 384-2

- A. Chronic inflammatory demyelinating polyneuropathy (CIDP)

- B. Guillain-Barré syndrome
- C. Spinal muscular atrophy (SMA)
- D. Diabetes mellitus

In the scenario of symmetric distal sensory loss with or without distal weakness, cryptogenic or idiopathic sensory polyneuropathy (CSPN), diabetes mellitus and other metabolic disorders, drugs, toxins, hereditary (Charcot-Marie-Tooth, amyloidosis, and others) are a possibility.

1581 Which of the following is a possibility in asymmetric distal weakness with sensory loss with involvement of multiple nerves ?

Harrison's 18th Ed. 3451 Table 384-2

- A. Multifocal CIDP
- B. Sarcoidosis
- C. Hereditary neuropathy with liability to pressure palsies
- D. All of the above

Asymmetric distal weakness with sensory loss with involvement of multiple nerves may occur in multifocal CIDP, vasculitis, cryoglobulinemia, amyloidosis, sarcoid, infectious (leprosy, Lyme, hepatitis B or C, HIV, CMV), hereditary neuropathy with liability to pressure palsies (HNPP), tumor infiltration

1582 Which of the following is a possibility in asymmetric proximal and distal weakness with sensory loss ?

Harrison's 18th Ed. 3451 Table 384-2

- A. Diabetes mellitus
- B. Meningeal carcinomatosis
- C. Hereditary neuropathy with liability to pressure palsies
- D. All of the above

Asymmetric proximal and distal weakness with sensory loss can be seen in polyradiculopathy or plexopathy due to diabetes mellitus, meningeal carcinomatosis or lymphomatosis, hereditary plexopathy (HNPP, HNA), idiopathic

1583 Which of the following is a possibility in asymmetric distal weakness (UMN) without sensory loss ?

Harrison's 18th Ed. 3451 Table 384-2

- A. Diabetes mellitus
- B. Multifocal motor neuropathy
- C. Motor neuron disease
- D. Progressive muscular atrophy

Asymmetric distal weakness without sensory loss with upper motor neuron findings is seen in motor neuron disease. Those without upper motor neuron findings is seen in progressive muscular atrophy, juvenile monomelic amyotrophy (Hirayama disease), multifocal motor neuropathy, multifocal acquired motor axonopathy.

1584 Which of the following is a possibility in symmetric sensory loss and distal areflexia with upper motor neuron findings ?

Harrison's 18th Ed. 3451 Table 384-2

- A. Vitamin B12 deficiency
- B. Vitamin E deficiency
- C. Copper deficiency
- D. All of the above

Symmetric sensory loss and distal areflexia with upper motor neuron findings is seen in Vitamin B12, vitamin E, and copper deficiency with combined system degeneration with peripheral neuropathy, hereditary leukodystrophies (adrenomyeloneuropathy)

1585 Which of the following is a possibility in symmetric weakness without sensory loss ?

Harrison's 18th Ed. 3451 Table 384-2

- A. Guillain-Barré syndrome
- B. Spinal muscular atrophy

- C. Diabetes mellitus
- D. Chronic inflammatory demyelinating polyneuropathy (CIPD)

Symmetric weakness without sensory loss with proximal and distal weakness is seen in spinal muscular atrophy and with distal weakness seen in hereditary motor neuropathy ("distal" SMA) or atypical CMT

1586 If the patient has only weakness without any evidence of sensory or autonomic dysfunction, the diagnosis can be ?

Harrison's 18th Ed. 3448

- A. Motor neuropathy
- B. Neuromuscular junction abnormality
- C. Myopathy
- D. Any of the above

If the patient has only weakness without any evidence of sensory or autonomic dysfunction, a motor neuropathy, neuromuscular junction abnormality, or myopathy can be the cause.

1587 Heat intolerance is a symptom due to which of the following abnormalities ?

Harrison's 18th Ed. 3448

- A. Motor
- B. Sensory
- C. Autonomic
- D. All of the above

Symptoms of autonomic neuropathy are fainting spells or orthostatic lightheadedness (orthostatic fall in blood pressure without an appropriate increase in heart rate), heat intolerance or any bowel, bladder, or sexual dysfunction.

1588 Majority of neuropathies are predominantly ?

Harrison's 18th Ed. 3448

- A. Motor
- B. Sensory
- C. Autonomic
- D. Combined

Majority of neuropathies are predominantly sensory in nature.

1589 Symmetric proximal and distal weakness is the hallmark of ?

Harrison's 18th Ed. 3448

- A. Charcot-Marie-Tooth disease
- B. Guillain-Barré syndrome (GBS)
- C. Motor neuron disease
- D. Diabetes mellitus

Symmetric proximal & distal weakness is the hallmark of acquired immune demyelinating polyneuropathies, both acute form (AIDP) also known as Guillain-Barré syndrome (GBS) and the chronic inflammatory demyelinating polyneuropathy (CIPD).

1590 Which of the following is the cause of combined system degeneration with neuropathy ?

Harrison's 18th Ed. 3449

- A. Vitamin B12 deficiency
- B. Copper deficiency
- C. HIV infection
- D. All of the above

Symmetric distal sensory neuropathy, with symmetric upper motor neuron involvement, suggests combined system degeneration with neuropathy as seen in vitamin B12 deficiency, copper deficiency, HIV infection, severe hepatic disease & adrenomyeloneuropathy.

1591 Which of the following neuropathies does not present acutely or subacutely ?

Harrison's 18th Ed. 3449

- A. GBS
- B. Diabetes
- C. Lyme disease
- D. Porphyria

Neuropathies with acute and subacute presentations include GBS, vasculitis, and radiculopathies related to diabetes or Lyme disease. A relapsing course is seen in CIPD and porphyria.

1592 Fixatives containing which element can lead to copper deficiency ?

Harrison's 18th Ed. 3449

- A. Aluminium
- B. Lead
- C. Zinc
- D. Nickel

Fixatives that contain zinc that can lead to copper deficiency.

1593 Which of the following is not a EDx finding in axonal neuropathy ?

Harrison's 18th Ed. 3450

- A. Low-amplitude potentials
- B. Absence of fibrillations
- C. Relatively preserved distal latencies
- D. Relatively preserved conduction velocities

Nerve conduction studies (NCS) are helpful in differentiating between axonal degeneration or segmental demyelination. Low-amplitude potentials with relatively preserved distal latencies, conduction velocities, and late potentials, along with fibrillations suggest an axonal neuropathy. Relatively preserved amplitudes, slow conduction velocities, prolonged distal latencies and late potentials, and absence of fibrillations imply a primary demyelinating neuropathy.

1594 Most common cause of sensory ganglionopathies is ?

Harrison's 18th Ed. 3450

- A. Porphyria
- B. Diabetes mellitus
- C. Vitamin B12 deficiency
- D. Sjögren syndrome

Most common causes of sensory ganglionopathies presenting as severe sensory ataxia are Sjögren syndrome and paraneoplastic neuropathy.

1595 Most commonly biopsied nerve is ?

Harrison's 18th Ed. 3452

- A. Superficial peroneal nerve
- B. Common peroneal nerve
- C. Sural nerve
- D. Superficial lateral cutaneous nerve

Nerve biopsies should be done only if NCS studies are abnormal. Sural nerve is most commonly biopsied because it is a pure sensory nerve and biopsy will not result in loss of motor function.

1596 Which of the following physical finding favours diagnosis of CMT ?

Harrison's 18th Ed. 3452

- A. Inverted champagne bottle appearance of legs
- B. Hammer toes
- C. High arched feet (pes cavus)
- D. All of the above

Wasting & weakness of distal muscles of legs lead to inverted champagne bottle like appearance. Hammer toes & pes cavus are common & indicate onset of CMT in early life.

1597 Diagnosis of CMT is favoured by which of the following observation ?*Harrison's 18th Ed. 3452*

- A. Early age of onset
- B. Positive family history
- C. Long standing symptoms
- D. All of the above

Diagnosis of CMT is favoured by an early age of onset, positive family history, and long standing symptoms. If EDx findings indicate a demyelinating process, diagnosis of CMT can be made with confidence.

1598 Mutations in myelin protein zero (MPZ, or P₀) gene can produce which of the following ?*Harrison's 17th Ed. 2662*

- A. DéJérine-Sottas Syndrome (DSS)
- B. Congenital Hypomyelinating Neuropathy (CHN)
- C. Charcot-Marie-Tooth 2 (CMT2) axonal neuropathy
- D. All of the above

Mutations in myelin protein zero (MPZ, or P₀) gene can produce DSS, CHN, or CMT2.

1599 Infantile-onset or severe childhood forms of CMT include ?*Harrison's 17th Ed. 2662*

- A. DéJérine-Sottas syndrome (DSS)
- B. Congenital hypomyelinating neuropathies (CHN)
- C. Roussy-Lévy syndrome
- D. All of the above

Infantile-onset or severe childhood forms of CMT include DéJérine-Sottas syndrome (DSS), congenital hypomyelinating neuropathies (CHN) and Roussy-Lévy syndrome.

1600 Which of the following is the role of PMP22 ?*Harrison's 17th Ed. 2662*

- A. Initiation of myelin spirals
- B. Regulation & growth of Schwann cells
- C. Maintenance of myelin sheaths
- D. All of the above

1601 Which of the following is the role of P₀ ?*Harrison's 17th Ed. 2662*

- A. Initiation of myelin spirals
- B. Regulation & growth of Schwann cells
- C. Maintenance of myelin sheaths
- D. Myelin compaction

PMP22 plays a role in initiation of myelin spirals, regulation & growth of Schwann cells, control of thickness, stability & maintenance of myelin sheaths. P₀ is important in myelin compaction.

1602 Which of the following proteins is restricted to CNS myelin ?*Harrison's 17th Ed. 2480*

- A. P₀ protein
- B. PMP22
- C. Proteolipid protein (PLP)
- D. Myelin-associated glycoprotein (MAG)

Protein restricted to CNS myelin are proteolipid protein (PLP) and myelin oligodendrocyte glycoprotein (MOG) while that in PNS myelin are P₀, PMP22 and Cx32. Proteins present in both CNS & PNS are GM1, myelin-associated glycoprotein (MAG) and GQ1b.

1603 Which of the following is false about Schmidt-Lanterman incisures ?*The Journal of Neuroscience 2005;25(13):3259 -3269*

- A. Noncompacted regions of myelin
- B. Contains cytoplasm
- C. Transport metabolic substances across myelin sheath
- D. None of the above

Schwann cells form myelin sheath around peripheral nerve axons as either highly compacted membrane or noncompacted cytoplasmic regions (Schmidt-Lanterman incisures or SLI). SLI are important for transport of metabolic substances across myelin sheath and for metabolic maintenance & longitudinal growth of sheath.

1604 Palpably thickened nerves in CMT1 is due to increase in ?*Harrison's 17th Ed. 2662*

- A. Hyaline
- B. Mucopolysaccharides
- C. Collagen
- D. Glycogen

In CMT1, increased collagen between layers of supernumerary Schwann cells leads to palpably thickened nerves.

1605 Which of the following is false about myelin ?*Harrison's 17th Ed. 2480*

- A. It speeds impulse conduction
- B. Single oligodendrocyte ensheaths multiple CNS axons
- C. Each Schwann cell myelinates a single PNS axon
- D. It is a protein-rich material

Myelin is a lipid-rich material formed by a spiraling process of the membrane of myelinating cell around the axon.

1606 Pelizaeus Merzbacher disease is caused by mutations in gene for ?*Harrison's 17th Ed. 2480 Figure 360-1*

- A. Proteolipid protein (PLP)
- B. P₀ protein
- C. Myelin oligodendrocyte glycoprotein (MOG)
- D. Myelin basic protein (MBP)

Pelizaeus-Merzbacher syndrome is a dysmyelinating X-linked allelic disorder of CNS, caused by mutations in gene for proteolipid protein (PLP) that promotes extracellular compaction between adjacent myelin lamellae.

1607 Which of the following is called tomaculous neuropathy ?*Harrison's 17th Ed. 2663*

- A. DéJérine-Sottas Syndrome (DSS)
- B. Hereditary neuropathy with liability to pressure palsies
- C. Roussy-LéVY Syndrome
- D. Congenital Hypomyelinating Neuropathy (CHN)

Autosomal dominant disorder Hereditary neuropathy with liability to pressure palsies (HNPP) is also called tomaculous neuropathy. Tomaculae are sausage-shaped bodies that indicate segmental demyelination.

1608 Which of the following is false about Charcot-Marie-Tooth Disease (CMT) ?*Harrison's 17th Ed. 2662*

- A. Heritable neuromuscular disorder
- B. Chronic distal sensory and motor neuropathy
- C. CMT does not reduce the life span

D. None of the above

CMT is the most common heritable neuromuscular disorder. It is a chronic distal sensory & motor neuropathy. Pes cavus & hammer toes indicate that neuropathy dates from early life. CMT does not reduce life span & rarely involves respiratory muscles.

1609 Which of the following is the most common type of hereditary neuropathy ?

Harrison's 18th Ed. 3452

- A. Hereditary Neuralgic Amyotrophy (HNA)
- B. Hereditary Neuropathy with Liability to Pressure Palsies (HNPP)
- C. Charcot-Marie-Tooth (CMT) disease
- D. Hereditary Sensory and Autonomic Neuropathy (HSAN)

Charcot-Marie-Tooth (CMT) disease is a syndrome of several genetically distinct disorders. It is the most common type of hereditary neuropathy.

1610 Various subtypes of CMT are classified according to ?

Harrison's 18th Ed. 3452

- A. Predominant pathology
- B. Nerve conduction velocities
- C. Inheritance pattern
- D. All of the above

Various subtypes of CMT are classified according to the nerve conduction velocities and predominant pathology (demyelination or axonal degeneration), inheritance pattern (autosomal dominant, recessive, or X-linked), and the specific mutated genes.

1611 In CMT1, motor conduction velocities in the arms are slowed to ?

Harrison's 18th Ed. 3452

- A. < 38 m/sec.
- B. < 48 m/sec.
- C. < 58 m/sec.
- D. < 68 m/sec.

By definition, motor conduction velocities in the arms are slowed to < 38 m/sec in CMT1 and are greater than 38 m/sec in CMT2.

1612 Transmission of Charcot-Marie-Tooth (CMT) neuropathy diseases is ?

Harrison's 18th Ed. 3452

- A. Autosomal dominant
- B. Autosomal recessive
- C. X-linked
- D. All of the above

CMT is usually transmitted as autosomal dominant trait, as X-linked-dominant CMT in ~10%. Rare autosomal recessive forms (CMT4) have an early onset & are more severe than dominant types.

1613 Inheritance of CMT1 is ?

Harrison's 18th Ed. 3452

- A. Autosomal dominant
- B. Autosomal recessive
- C. X-linked
- D. Any of the above

Inheritance of CMT1 is autosomal dominant.

1614 Which of the following about Charcot-Marie-Tooth disease is false ?

N Engl J Med 2006;354:2584-92

- A. CMT1 and 2 are autosomal dominant
- B. CMT1 is a demyelinating polyneuropathy
- C. CMT2 is an axonal polyneuropathy
- D. None of the above

Charcot-Marie-Tooth disease type 1 is most common inherited demyelinating sensorimotor neuropathy, followed by type 2. Both are autosomal dominant. Type 1 is a demyelinating polyneuropathy, whereas type 2 is an axonal sensory polyneuropathy.

1615 Which of the following is an autosomal recessive neuropathy ?

Harrison's 18th Ed. 3452

- A. CMT1
- B. CMT2
- C. CMT3
- D. CMT4

CMT1, CMT2 and CMT3 have autosomal dominant inheritance (with a few exceptions). CMT4 (genetically heterogenic) is an autosomal recessive neuropathy.

1616 The ratio of occurrence of CMT1:CMT2 is approximately ?

Harrison's 18th Ed. 3452

- A. 1 : 1
- B. 2 : 1
- C. 3 : 1
- D. 4 : 1

CMT1 is the most common form of hereditary neuropathy. The ratio of CMT1:CMT2 is ~2:1.

1617 CMT1 is which form of CMT ?

Harrison's 18th Ed. 3452, Harrison's 17th Ed. 2663

- A. Demyelinating
- B. Axonal
- C. Intermediate
- D. Any of the above

1618 CMT2 is which form of CMT ?

Harrison's 18th Ed. 3452, Harrison's 17th Ed. 2663

- A. Demyelinating
- B. Axonal
- C. Intermediate
- D. Any of the above

Demyelinating forms of CMT are classified as CMT1, and axonal forms as CMT2. Nerve conduction velocities (NCVs) intermediate between CMT1 & CMT2 are classified as "intermediate CMT" and most of these are X-linked.

1619 Which of the following manifestation prompts suspicion of CMT1 ?

Harrison's 18th Ed. 3454

- A. Bed sore
- B. Numbness or tingling
- C. Footdrop
- D. Frequent falls

CMT1 usually present in the first to third decade of life with distal leg weakness (footdrop). People with CMT generally do not complain of numbness or tingling, which helps in distinguishing CMT from acquired forms of neuropathy in which sensory symptoms usually predominate.

1620 Which of the following manifestation prompts suspicion of CMT1 ?

Harrison's 18th Ed. 3454

- A. Reduced sensation to all modalities
- B. Reduced muscle stretch reflexes
- C. Atrophy of muscles below knee
- D. All of the above

In CMT1, reduced sensation to all modalities is apparent on examination. Muscle stretch reflexes are absent or reduced. Atrophy of muscles below knee (particularly anterior compartment), leads to inverted champagne bottle legs.

1621 In CMT1, characteristic nerve biopsy appearance is ?

Harrison's 18th Ed. 3454

- A. Mulberry appearance
- B. Cabbage appearance
- C. Potato peel appearance
- D. Onion bulb appearance

Nerve biopsies show evidence of repeated demyelination & remyelination. Supernumerary, concentrically arranged, Schwann cells attempting to remyelinate axons give a characteristic "onion bulb" appearance.

1622 The most common form of CMT1 is ?

Harrison's 18th Ed. 3454

- A. 1A subtype
- B. 2A subtype
- C. 2B subtype
- D. 2C subtype

CMT1A is the most common subtype of CMT1, representing 70% of cases.

1623 CMT 1A subtype is caused by ?

Harrison's 18th Ed. 3454

- A. Duplication of PMP22 gene
- B. Deletion in PMP22
- C. Translocation in PMP22
- D. All of the above

CMT1A is caused by a 1.5-megabase (Mb) duplication within peripheral myelin protein-22 (PMP-22) gene containing chromosome 17p11.2-12 resulting in patients having three copies of the PMP-22 gene rather than two.

1624 Charcot-Marie-Tooth disease (CMT) type 1B is caused by mutations in gene for ?

Harrison's 18th Ed. 3454

- A. Proteolipid protein (PLP)
- B. P₀ protein
- C. Myelin oligodendrocyte glycoprotein (MOG)
- D. Myelin basic protein (MBP)

CMT1B is due to a mutation in the myelin protein zero (MPZ, or P₀) gene.

1625 CMT2 is caused by mutations for which gene ?

Harrison's 18th Ed. 3455

- A. Alpha-galactosidase gene
- B. ATP-binding cassette transporter 1 (ABC1) gene
- C. Mitofusin 2 (MFN2) gene
- D. Transthyretin (TTR) gene

Most common cause of CMT2 is a mutation in the gene for mitofusin 2 (MFN2) which is localized to the outer mitochondrial membrane, where it regulates the mitochondrial network architecture by fusion of mitochondria.

1626 DéJérine-Sottas disease is also called ?

Harrison's 18th Ed. 3455

- A. CMT type 1

- B. CMT type 2
- C. CMT type 3
- D. CMT type 4

CMT3 was originally described by Dejerine and Sottas as a hereditary demyelinating sensorimotor polyneuropathy presenting in infancy or early childhood.

1627 DéJérine-Sottas syndrome is similar to ?

Harrison's 17th Ed. 2663, Harrison's 18th Ed. 3454 Table 384-4

- A. CMT2A
- B. CMT2B
- C. Congenital hypomyelinating neuropathy (CHN)
- D. Roussy-Lévy Syndrome

DéJérine-Sottas syndrome & Congenital hypomyelinating neuropathy are indistinguishable. Nerve biopsy can distinguish them.

1628 DéJérine-Sottas syndrome is caused by mutations of ?

Harrison's 18th Ed. 3455

- A. PMP22
- B. Myelin protein zero (MPZ)
- C. Early growth response gene (ERG2)
- D. All of the above

Most cases of CMT3 are caused by point mutations in the genes for PMP-22, MPZ, or ERG-2, which are also the genes responsible for CMT1.

1629 Gap junctions consist of membrane-spanning proteins called ?

Harrison's 18th Ed. 3455

- A. Spannings
- B. Membranins
- C. Connexins
- D. All of the above

Connexins are gap junction structural proteins that are important in cell-to-cell communication. Gap junctions provide direct neuron-neuron electrical conduction and also create openings for the diffusion of ions and metabolites between cells. Gap junctions membrane-spanning proteins, expressed by Schwann cells are connexins, that pair across adjacent cells.

1630 Mutation of which gene of gap junction protein is responsible for X-linked Charcot-Marie-Tooth disease ?

Harrison's 18th Ed. 3455

- A. Connexin 26
- B. Connexin 32
- C. Connexin 42
- D. Connexin 48

Mutations in connexin 32 are responsible for X-linked form of CMT disease (CMT1X). Mutated gene is GJB1.

1631 Which of the following about HNPP is false ?

Harrison's 18th Ed. 3455

- A. Affected individuals have only one copy of PMP-22 gene
- B. Weakness in distribution of single peripheral nerves
- C. Symptoms precipitated by trivial compression of nerve
- D. None of the above

Hereditary Neuropathy with Liability to Pressure Palsies (HNPP) is an autosomal dominant disorder. CMT1A is associated with duplication in chromosome 17p11.2 resulting in an extra copy of PMP-22 gene, whereas in HNPP, affected individuals have only one copy of the PMP-22 gene.

1632 Most commonly involved nerve in HNPP is ?

Harrison's 17th Ed. 2663

- A. Peroneal

- B. Ulnar
- C. Radial
- D. Median

HNPP presents as recurrent focal entrapment neuropathy (numbness & weakness) most frequently in peroneal then ulnar, radial & median nerves.

1633 Hereditary Neuralgic Amyotrophy (HNA) is caused by mutations in ?
Harrison's 18th Ed. 3455

- A. Septin 9 (SEPT9)
- B. ATP-binding cassette transporter 1 (ABC1) gene
- C. Mitofusin 2 (MFN2) gene
- D. Transthyretin (TTR) gene

HNA is caused by mutations in septin 9 (SEPT9). Septins may be important in formation of the neuronal cytoskeleton and have a role in cell division.

1634 Which of the following is best related to Hereditary Neuralgic Amyotrophy (HNA) ?
Harrison's 18th Ed. 3455

- A. Lumbosacral plexus
- B. Brachial plexus
- C. Charcot joints
- D. Deep dermal ulcerations

HNA is an autosomal dominant disorder characterized by recurrent attacks of pain, weakness, and sensory loss in the distribution of brachial plexus.

1635 Apart from demyelinating CMT, what else characterizes Roussy-Lévy syndrome ?
Harrison's 17th Ed. 2663

- A. Action tremor
- B. Deafness
- C. Blindness
- D. Spina bifida

Roussy-Lévy syndrome is a combination of demyelinating CMT with postural and action tremor.

1636 Riley-Day syndrome is also called ?
Harrison's 17th Ed. 2663

- A. HSAN 1
- B. HSAN 2
- C. HSAN 3
- D. HSAN 4

Hereditary sensory neuropathies (HSN) are also called hereditary sensory & autonomic neuropathies (HSANs). Out of five subtypes, HSAN 1 is most common. HSAN 3 is also called Riley-Day syndrome.

1637 Hereditary Sensory and Autonomic Neuropathy1A (HSAN1A) is caused by mutations in ?
Harrison's 18th Ed. 3455

- A. Septin 9 (SEPT9)
- B. Serine palmitoyltransferase long-chain base 1 (SPTLC1)
- C. Mitofusin 2 (MFN2)
- D. Transthyretin (TTR)

HSAN1A is caused by mutations in serine palmitoyltransferase long-chain base 1 (SPTLC1) gene.

1638 Which of the following is a feature of HSAN1 ?
Harrison's 18th Ed. 3455

- A. Deep dermal ulcerations

- B. Recurrent osteomyelitis
- C. Gross foot and hand deformities
- D. All of the above

HSAN1 is associated with degeneration of small myelinated & unmyelinated nerve fibers leading to severe loss of pain & temperature sensation, deep dermal ulcerations, recurrent osteomyelitis, Charcot joints, bone loss, gross foot and hand deformities, and amputated digits.

1639 Which of the following about Fabry Disease is false ?
Harrison's 18th Ed. 3455

- A. X-linked dominant disorder
- B. Reddish-purple maculopapular lesions
- C. Premature atherosclerosis
- D. None of the above

1640 Fabry disease is caused by mutations in ?
Harrison's 18th Ed. 3455

- A. Alpha-galactosidase gene
- B. ATP-binding cassette transporter 1 (ABC1) gene
- C. Mitofusin 2 (MFN2) gene
- D. Transthyretin (TTR) gene

Fabry disease is caused by mutations in alpha-galactosidase gene that leads to accumulation of ceramide trihexoside in nerves and blood vessels.

1641 Manifestations of Fabry disease include all except ?
Harrison's 18th Ed. 3191

- A. Angiokeratomas (telangiectatic skin lesions)
- B. Hyperhidrosis
- C. Corneal and lenticular opacities
- D. Acroparesthesia

Fabry's disease manifests with angiokeratomas (telangiectatic skin lesions), hypohidrosis, corneal and lenticular opacities, acroparesthesia and small-vessel disease of kidney, heart, and brain.

1642 Angiokeratomas in Fabry's disease are best seen in ?
Harrison's 18th Ed. 3191

- A. Between umbilicus and knees
- B. Nape of the neck
- C. Fingers of hand
- D. Nose

Angiokeratomas in Fabry's disease are punctate, dark red to blue-black, flat or slightly raised, and usually symmetric. They do not blanch with pressure. They are most dense between umbilicus and knees "bathing suit area".

1643 Which of the following is related to Fabry's disease ?
Harrison's 18th Ed. 2350

- A. Zebra bodies
- B. Maltese cross
- C. Cornea verticillata
- D. All of the above

Renal biopsy reveals small clear vacuoles containing globotriaosylceramide in glomeruli, parietal and tubular epithelia. These vacuoles of electron-dense materials in parallel arrays (zebra bodies) are easily seen on electron microscopy. Urinalysis in Fabry's disease may reveal oval fat bodies and birefringent glycolipid globules under polarized light (Maltese cross).

1644 Footdrop is a prominent feature of ?
Harrison's 18th Ed. 3456

- A. Refsum disease
- B. Peroneal Neuropathy

- C. CMT1
- D. All of the above

1645 Refsum disease is caused by defective oxidation of ?

Harrison's 18th Ed. 3456

- A. Formic acid
- B. Glycolic acid
- C. Oxalic acid
- D. Phytanic acid

Refsum disease (autosomal recessive) is caused by mutations in the gene that encodes for phytanoyl-CoA alpha-hydroxylase (PAHX). This mutations lead to elevation of serum phytanic acid levels and accumulation of phytanic acid in central and peripheral nervous systems. Refsum disease is treated by removing phytanic precursors (phytols: fish oils, dairy products, and ruminant fats) from diet.

1646 The classic tetrad of Refsum disease include all except ?

Harrison's 18th Ed. 3456

- A. Peripheral neuropathy
- B. Retinitis pigmentosa
- C. Cerebellar ataxia
- D. Normal CSF protein concentration

The classic tetrad of Refsum disease include peripheral neuropathy, retinitis pigmentosa, cerebellar ataxia, and elevated CSF protein concentration.

1647 Presentation of Refsum disease include ?

Harrison's 17th Ed. 2664

- A. Anosmia
- B. Sensorineural deafness
- C. Cerebellar ataxia
- D. All of the above

Features of Refsum disease include sensorimotor demyelinating neuropathy, sensorineural deafness, cerebellar ataxia, anosmia, retinitis pigmentosa, ichthyosis, syndactyly, shortening of the fourth toe, cardiomyopathy and cataracts.

1648 Severe deficiency of which of the following occurs in Tangier Disease (TD) ?

Harrison's 18th Ed. 3456

- A. High-density lipoproteins (HDL)
- B. Low-density lipoproteins (HDL)
- C. Very low-density lipoproteins (HDL)
- D. Triglycerides

Tangier disease is caused by mutations in the ATP-binding cassette transporter 1 (ABC1) gene, which leads to markedly reduced levels of high-density lipoprotein (HDL) cholesterol levels while triacylglycerol levels are increased.

1649 Presentation of Tangier disease resembles those of ?

Harrison's 18th Ed. 3456

- A. Guillain-Barré syndrome
- B. Syringomyelia
- C. Multiple sclerosis
- D. Amyotrophic lateral sclerosis

Tangier disease is a rare autosomal recessive disorder that can present as asymmetric multiple mononeuropathies, slowly progressive symmetric polyneuropathy predominantly in legs, and a pseudo-syringomyelia pattern with dissociated sensory loss (i.e., abnormal pain/temperature perception but preserved position/vibration in the arms).

1650 Which of the following forms of porphyria are associated with peripheral neuropathy ?

Harrison's 18th Ed. 3456

- A. Acute intermittent porphyria (AIP)
- B. Hereditary coproporphyria (HCP)
- C. Variegate porphyria (VP)
- D. All of the above

Three forms of porphyria are associated with peripheral neuropathy - acute intermittent porphyria (AIP), hereditary coproporphyria (HCP), and variegate porphyria (VP).

1651 Which of the following tests is useful in porphyria ?

Harrison's 17th Ed. 2664

- A. Increased urinary excretion of aminolevulinic acid
- B. Increased urinary excretion of porphobilinogen
- C. Increased 24-hour fecal excretion of protoporphyrin & coproporphyrin
- D. All of the above

1652 Mutations in which of the following genes is responsible for familial amyloid neuropathy ?

Harrison's 18th Ed. 3457

- A. Transthyretin (FAP 1 & 2)
- B. Apolipoprotein A1 (FAP 3)
- C. Gelsolin (FAP 4)
- D. All of the above

Familial amyloid polyneuropathy (FAP) is phenotypically and genetically heterogeneous and is caused by mutations in the genes for transthyretin (TTR), apolipoprotein A1, or gelsolin. The majority of patients with FAP have mutations in the TTR gene.

1653 Which of the following modalities halts disease progression in familial amyloid neuropathy ?

Harrison's 18th Ed. 3457

- A. Plasmapheresis
- B. Liver transplantation
- C. Kidney transplantation
- D. IVIg

Because the liver produces much of the body's TTR, liver transplantation has been used to treat FAP related to TTR mutations. Liver transplantation halts disease progression of FAP.

1654 Presence of which of the following is a risk factors for diabetic neuropathy ?

Harrison's 18th Ed. 3457

- A. Long-standing, poorly controlled DM
- B. Presence of retinopathy
- C. Presence of nephropathy
- D. All of the above

Risk factors for the development of diabetic neuropathy include long-standing, poorly controlled DM and presence of retinopathy & nephropathy.

1655 Which of the following is the most common form of diabetic neuropathy ?

Harrison's 18th Ed. 3457

- A. Diabetic truncal radiculoneuropathy (DTRN)
- B. Diabetic lumbosacral radiculoplexus neuropathy
- C. Oculomotor (III or VI nerve) neuropathy
- D. Diabetic sensorimotor polyneuropathy (DSPN)

Diabetic Distal Symmetric Sensory and Sensorimotor Polyneuropathy (DSPN) is the most common form of diabetic neuropathy.

1656 Sensory loss in DSPN begins in ?

Harrison's 18th Ed. 3457

- A. Nose
- B. Fingers
- C. Toes
- D. Buttocks

DSPN manifests as sensory loss beginning in the toes that gradually progresses over time up the legs and into the fingers and arms.

1657 Which of the following nerves are involved in diabetic sensorimotor polyneuropathy (DSPN) ?

Harrison's 17th Ed. 2656

- A. Small- and large-fiber sensory
- B. Autonomic
- C. Motor
- D. All of the above

DSPN is a mixed neuropathy with small- & large-fiber sensory, autonomic, & motor nerve involvement in various combinations. Sensory & autonomic symptoms are more prominent than motor.

1658 Which of the following has relevance in the pathogenesis of diabetic sensorimotor polyneuropathy (DSPN) ?

Harrison's 17th Ed. 2656

- A. Myo-inositol
- B. Betaine
- C. Glutamine
- D. All of the above

DSPN could be caused by an increased neuronal glucose conversion to sorbitol by aldose reductase using NADPH as a coenzyme. Sorbitol decreases levels of myo-inositol and phosphoinositides, leading to a decrease in diacylglycerol, protein kinase C, and Na⁺, K⁺, ATPase activity. This sequence of events leads to axonal loss & demyelination.

1659 Diabetic autonomic neuropathy is typically seen in combination with ?

Harrison's 18th Ed. 3457

- A. DSPN
- B. Diabetic neuropathic cachexia
- C. Polyradiculoneuropathies
- D. Cranial neuropathies

Autonomic neuropathy is typically seen in combination with DSPN.

1660 Initial presentation in diabetic amyotrophy or Bruns-Garland Syndrome is ?

Harrison's 18th Ed. 3458

- A. Pain
- B. Sensory loss
- C. Muscle weakness
- D. Diplopia

Typically, patients of diabetic radiculoplexus neuropathy present with severe pain in low back, hip, and thigh in one leg. Atrophy & weakness of proximal & distal muscles in the affected leg become apparent within a few days or weeks. Neuropathy is often accompanied by severe weight loss.

1661 Asymmetric abrupt-onset diabetic neuropathy is ?

Harrison's 17th Ed. 2656

- A. Diabetic truncal radiculoneuropathy (DTRN)
- B. Diabetic lumbosacral radiculoplexus neuropathy
- C. Cranial neuropathy

D. All of the above

Asymmetric abrupt-onset diabetic neuropathies include diabetic truncal radiculoneuropathy (DTRN), diabetic lumbosacral radiculoplexus neuropathy (DLSRPN) & oculomotor (III or VI nerve) neuropathy.

1662 Which is the most frequently involved cranial nerve in diabetes ?

Harrison's 17th Ed. 2656

- A. III
- B. IV
- C. VI
- D. VII

Cranial neuropathy occurs in those over 50 years and who already have evidence of DSPN. Abducens (sixth) nerve is most often affected. Spontaneous recovery typically occurs within 3 - 5 months. Bell's palsy is common in older diabetics.

1663 Which is the most frequently involved cranial nerve in diabetes ?

Harrison's 18th Ed. 3458

- A. III
- B. IV
- C. VI
- D. VII

In regard to cranial mononeuropathies, a seventh nerve palsy is most common, followed by third nerve, sixth nerve, and, less frequently, fourth nerve palsies.

1664 Which of the following is not a feature of diabetic third nerve palsy ?

Harrison's 17th Ed. 2657

- A. Abrupt in onset
- B. Intense retroorbital pain
- C. Bilateral ptosis
- D. Restriction of medial gaze & upgaze

Diabetic III nerve palsy is abrupt in onset, heralded by intense retroorbital pain, double vision, unilateral ptosis & restriction of medial gaze & upgaze.

1665 Which of the following is not a feature of diabetic third nerve palsy ?

Harrison's 18th Ed. 3458

- A. Abrupt in onset
- B. Intense retroorbital pain
- C. Dilated pupil
- D. Improve spontaneously in 3 - 6 months

Pupil is nearly always spared in diabetic III nerve palsy as pupillomotor fibers are present on the outer layers of III nerve fascicle, and an ischemic lesion tends to involve the center of the fascicle. Thus, diabetic third nerve palsies are characteristically pupil-sparing.

1666 Trigeminal neuropathy occurs in which of the following illnesses ?

Harrison's 18th Ed. 3458

- A. Systemic sclerosis (Scleroderma)
- B. Sjögren syndrome
- C. Leprosy
- D. All of the above

1667 Which of the following is related to insulin treatment for diabetes ?

Harrison's 17th Ed. 2657

- A. Diabetic truncal radiculoneuropathy
- B. Diabetic amyotrophy

- C. Insulin neuritis
- D. All of the above

Insulin neuritis is a painful neuropathy seen with initiation of insulin treatment for diabetes.

1668 Carpal tunnel syndrome can be a presentation of which of the following illnesses ?

Harrison's 18th Ed. 3459

- A. Familial amyloid polyneuropathy (FAP)
- B. Hypothyroidism
- C. Uremic neuropathy
- D. All of the above

1669 Clinical presentation can mimic Guillain-Barré syndrome in ?

Harrison's 18th Ed. 3459

- A. Porphyria
- B. Sarcoidosis
- C. Arsenic neuropathy
- D. All of the above

1670 Acute, severe sensorimotor polyneuropathy can resemble Guillain-Barré syndrome in ?

Harrison's 18th Ed. 3459

- A. Nitrofurantoin
- B. Inflammatory Bowel Disease
- C. Uremic Neuropathy
- D. All of the above

1671 Mycobacterium leprae causes ?

Harrison's 17th Ed. 2661

- A. Mononeuropathy
- B. Mononeuropathy multiplex
- C. Polyneuropathy
- D. Plexopathy

M. leprae causes mononeuropathy multiplex affecting peripheral nerves in cooler regions of body.

1672 Peripheral nerves are affected in which type of leprosy ?

Harrison's 18th Ed. 3460

- A. Tuberculoid
- B. Lepromatous
- C. Borderline
- D. All of the above

Peripheral nerves may be affected in all three types of leprosy. Neuropathies are most common in patients with borderline leprosy.

1673 In leprosy, sensory loss does not occur in all except ?

Harrison's 17th Ed. 2661

- A. Groin
- B. Axilla
- C. Pinnae of ears
- D. Scalp

In leprosy, sensory loss spares midline of trunk anteriorly, groin, axilla & scalp - the warmer regions of the body.

1674 Which of the following cranial nerves is involved in leprosy ?

Harrison's 17th Ed. 2661

- A. III

- B. V
- C. VI
- D. XI

V & VII cranial nerves, greater auricular nerve in neck, median & ulnar nerves, and peroneal nerves are involved in leprosy.

1675 Lyme disease is caused by ?

Harrison's 18th Ed. 3460

- A. Borrelia recurrentis
- B. Borrelia burgdorferi
- C. Borrelia hermsii
- D. Borrelia turicatae

Lyme disease is caused by infection with Borrelia burgdorferi, a spirochete.

1676 Diphtheritic neuropathy develops after how many months after the initial infection ?

Harrison's 18th Ed. 3460

- A. 1 or 2 months
- B. 2 or 3 months
- C. 3 or 4 months
- D. 4 or 5 months

A generalized polyneuropathy may manifest 2 or 3 months following the initial diphtheritic infection.

1677 Which of the following is the presentation of nerve involvement in HIV infection ?

Harrison's 18th Ed. 3460

- A. Polyradiculopathy
- B. Distal symmetric polyneuropathy (DSP)
- C. Inflammatory demyelinating polyneuropathy
- D. Any of the above

Major presentations of peripheral neuropathy associated with HIV infection include distal symmetric polyneuropathy (DSP), inflammatory demyelinating polyneuropathy (GBS & CIDP), multiple mononeuropathies (vasculitis, CMV-related), polyradiculopathy (CMV-related), autonomic neuropathy, and sensory ganglionitis.

1678 Most common form of peripheral neuropathy associated with HIV infection is ?

Harrison's 18th Ed. 3460

- A. Distal symmetric polyneuropathy (DSP)
- B. Inflammatory demyelinating polyneuropathy
- C. Autonomic neuropathy
- D. Sensory ganglionitis

DSP is the most common form of peripheral neuropathy associated with HIV infection and usually is seen in patients with AIDS.

1679 Lumbosacral polyradiculopathy in advanced HIV/AIDS is due to ?

Harrison's 18th Ed. 3460

- A. Herpes
- B. CMV infection
- C. Tuberculosis
- D. Lymphoma

Lumbosacral polyradiculopathies are usually due to CMV infection in advanced HIV/AIDS.

1680 Anti-HIV drug not associated with neuropathy is ?

Harrison's 18th Ed. 3460

- A. Zidovudine

- B. Lamivudine
- C. Abacavir
- D. All of the above

Zidovudine, lamivudine and abacavir are not associated with neuropathy. Dideoxycytidine, dideoxyinosine & stavudine are neurotoxic and can cause a painful sensory neuropathy.

1681 Most common malignancy causing neuropathies is ?

Harrison's 18th Ed. 3461

- A. Lung cancer
- B. Carcinoma breast
- C. Carcinoma ovary
- D. Carcinoma stomach

Most common malignancy causing neuropathy is lung cancer. Neuropathies also complicate carcinoma of breast, ovaries, stomach, colon, rectum.

1682 Paraneoplastic encephalomyelitis/sensory neuronopathy (PEM/SN) usually complicates which of the following malignancies ?

Harrison's 18th Ed. 3461

- A. Small cell lung carcinoma
- B. Carcinoma breast
- C. Carcinoma ovary
- D. Carcinoma stomach

Paraneoplastic encephalomyelitis/sensory neuronopathy (PEM/SN) usually complicates small cell lung carcinoma.

1683 Autoantigen found in sera / CSF of patients with paraneoplastic PEM/SN is ?

Harrison's 18th Ed. 3461

- A. Amphiphysin
- B. Hu protein
- C. Gephyrin
- D. Cyclin B1

Polyclonal antineuronal antibodies (IgG) directed against Hu antigen are found in sera or CSF in the majority of patients with paraneoplastic PEM/SN.

1684 Predominantly motor neuropathy is caused by ?

Harrison's 17th Ed. 2659

- A. Lead neuropathy
- B. Dapsone neuropathy
- C. Vincristine neuropathy
- D. All of the above

1685 Which of the following may cause optic neuropathy ?

Harrison's 17th Ed. 2659

- A. Chloramphenicol
- B. Ethambutol
- C. Nitrous oxide
- D. All of the above

1686 Which of the following is toxic to dorsal root ganglia neurons ?

Harrison's 17th Ed. 2659

- A. Cisplatin
- B. Paclitaxel
- C. Vincristine

- D. Thalidomide

Cisplatin is toxic to dorsal root ganglia neurons, producing a dose-related large-fiber sensory neuropathy (neuronopathy).

1687 Which of the following is not a feature of cisplatin toxicity ?

Harrison's 17th Ed. 2659

- A. Hearing loss
- B. Lhermitte's sign
- C. Sensory ataxia
- D. Decrease in motor strength

Small-fiber sensation (pain & temperature) and motor strength are spared in cisplatin toxicity.

1688 "Dying back" axonal neuropathy is a feature of ?

Harrison's 17th Ed. 2659

- A. Cisplatin toxicity
- B. Paclitaxel toxicity
- C. Vincristine toxicity
- D. Thalidomide toxicity

Paclitaxel affects microtubule assembly, causing disruption of axonal transport and a "dying back" axonal neuropathy.

1689 Which of the following is a potentially neurotoxic drug ?

Harrison's 18th Ed. 3462

- A. Isoniazid
- B. Disulfiram
- C. Pyridoxine
- D. All of the above

Nitrofurantoin, isoniazid, disulfiram and pyridoxine are potentially neurotoxic drugs. They cause a sensory greater than motor length-dependent axonal neuropathy or neuronopathy/ganglionopathy.

1690 Which of the following is inhibited by isoniazid (INH) resulting in pyridoxine deficiency and neuropathy ?

Harrison's 18th Ed. 3463

- A. Pyridoxal phosphate
- B. Pyridoxal 5'-phosphate
- C. Pyridoxal kinase
- D. Pyridoxal phosphokinase

INH inhibits pyridoxal phosphokinase, resulting in pyridoxine deficiency and consequent neuropathy. Prophylactic administration of pyridoxine 100 mg/day can prevent this neuropathy. Pyridoxine (Vitamin B6) refers to a family of compounds that include pyridoxine, pyridoxal, pyridoxamine, and their 5'-phosphate derivatives.

1691 What dose of Pyridoxine (Vitamin B₆) can cause toxicity ?

Harrison's 18th Ed. 3462

- A. 100 mg / day
- B. 106 mg / day
- C. 110 mg / day
- D. 116 mg / day

At high doses of Pyridoxine (116 mg/day), patients can develop a severe sensory neuropathy with dysesthesias and sensory ataxia.

1692 Most common presentation of lead poisoning is ?

Harrison's 18th Ed. 3466

- A. Sensory neuropathy
- B. Motor neuropathy
- C. Autonomic neuropathy

D. Encephalopathy

Most common presentation of lead poisoning is an encephalopathy. Motor neuropathy can also occur. Sensation is generally preserved. Autonomic nervous system can be affected.

1693 In lead poisoning, serum levels of which of the following is elevated ?

Harrison's 18th Ed. 3466

- A. Alpha fetoprotein
- B. Ceruloplasmin
- C. Coproporphyrin
- D. Prolactin

Serum coproporphyrin level is elevated in lead poisoning.

1694 Mee's lines are related to which of the following ?

Harrison's 18th Ed. 3467

- A. Mercury
- B. Arsenic
- C. Lead
- D. All of the above

Mee's lines are transverse lines at the base of fingernails & toenails. Mee's lines are seen in arsenic toxicity and following thallium poisoning.

1695 Diagnosis of vitamin B₁₂ deficiency is made by ?

Harrison's 18th Ed. 3467

- A. Low serum cobalamin levels
- B. Raised levels of methylmalonic acid
- C. Raised levels of homocysteine
- D. All of the above

Serum methylmalonic acid and homocysteine, the metabolites that accumulate when cobalamin-dependent reactions are blocked, are elevated.

1696 Erythrocyte transketolase activity is reduced in the blood of which nutritional neuropathy ?

Harrison's 18th Ed. 3468

- A. Thiamine (Vitamin B₁)
- B. Pyridoxine (Vitamin B₆)
- C. Cobalamin (Vitamin B₁₂)
- D. Riboflavin

Blood & urine assays for thiamine are not reliable for diagnosis of deficiency. Erythrocyte transketolase activity and the percentage increase in activity (in vitro) following the addition of thiamine pyrophosphate (TPP) may be more accurate & reliable.

1697 Drug that acts as pyridoxine (Vitamin B₆) antagonist is ?

Harrison's 17th Ed. 2660

- A. Isoniazid
- B. Cycloserine
- C. Penicillamine
- D. All of the above

Isoniazid, cycloserine and penicillamine act as pyridoxine antagonists by combining to aldehyde moiety of vitamin B₆. Vitamin B₆ deficiency is most commonly seen in patients treated with isoniazid or hydralazine.

1698 Measurement of xanthurenic acid after tryptophan loading helps in the diagnosis of ?

Harrison's 17th Ed. 2660

- A. Thiamine (Vitamin B₁) deficiency
- B. Pyridoxine (Vitamin B₆) deficiency

C. Cobalamin (Vitamin B₁₂) deficiency

D. Riboflavin deficiency

Measurement of xanthurenic acid after tryptophan loading can help confirm the diagnosis of pyridoxine (Vitamin B₆) deficiency.

1699 Strachan's syndrome is characterized by ?

Harrison's 17th Ed. 2660

- A. Painful sensory neuropathy
- B. Orogenital dermatitis
- C. Amblyopia and deafness
- D. All of the above

Strachan's syndrome is characterized by a painful sensory neuropathy associated with orogenital dermatitis, amblyopia and deafness.

1700 Clinical features of vitamin E deficiency resemble those of ?

Harrison's 17th Ed. 2660

- A. Subacute combined degeneration of spinal cord
- B. Friedreich's ataxia
- C. Pellagra
- D. Tabes dorsalis

Presentation of vitamin E deficiency resemble those of Friedreich's ataxia.

1701 Which of the following damage neurons in dorsal root ganglion ?

Harrison's 17th Ed. 2660

- A. Cisplatin
- B. Varicella zoster virus (VZV)
- C. Vitamin E deficiency
- D. All of the above

1702 The number of tendons in carpal tunnel is ?

Harrison's 16th Ed. 2501

- A. 7
- B. 8
- C. 9
- D. 10

1703 In carpal tunnel syndrome (CTS), nocturnal paresthesia is common in ?

Harrison's 16th Ed. 2501

- A. Thumb
- B. Index finger
- C. Middle finger
- D. All of the above

1704 Systemic diseases associated with carpal tunnel syndrome include ?

Harrison's 16th Ed. 2501

- A. Hypothyroidism
- B. Rheumatoid arthritis
- C. Diabetes mellitus
- D. All of the above

1705 The root value of median nerve is ?

Harrison's 16th Ed. 2502

- A. C5 - T1
- B. C6 - T1

- C. C7 - T1
- D. C8, T1

1706 The root value of ulnar nerve is ?

Harrison's 16th Ed. 2502

- A. C5 - T1
- B. C6 - T1
- C. C7 - T1
- D. C8, T1

1707 The root value of radial nerve is ?

Harrison's 16th Ed. 2502

- A. C5 - T1
- B. C6 - T1
- C. C7 - T1
- D. C8, T1

1708 Which of the following nerve is involved if the site of lesion is 'Cubital tunnel' ?

Harrison's 18th Ed. 3469

- A. Radial nerve
- B. Ulnar nerve
- C. Median nerve
- D. All of the above

Ulnar nerve passes through the condylar groove between the medial epicondyle and the olecranon. Ulnar neuropathy at the elbow is called "Cubital Tunnel Syndrome".

1709 Which of the following signs relate to diagnosis of a mononeuropathy ?

Harrison's 18th Ed. 3469

- A. Tinel's sign
- B. Phalen's sign
- C. Froment sign
- D. All of the above

In carpal tunnel syndrome (CTS), sensation of tingling can be reproduced when a percussion hammer is tapped over wrist (Tinel's sign) or wrist is flexed for 30 - 60 sec. (Phalen's sign). Froment sign indicates thumb adductor weakness and consists of flexion of thumb at the interphalangeal joint when attempting to oppose the thumb against lateral border of the second digit. This is seen in cubital tunnel syndrome.

1710 Meralgia paresthetica relates best to ?

Harrison's 18th Ed. 3469

- A. Radial Neuropathy
- B. Lateral Femoral Cutaneous Neuropathy
- C. Ulnar Neuropathy at the Elbow
- D. Peroneal Neuropathy

The neuropathy affecting lateral femoral cutaneous nerve is also known as meralgia paresthetica.

1711 Which of the following is false for Brachial Plexus ?

Harrison's 18th Ed. 3470

- A. Four roots
- B. Three trunks
- C. Two divisions per trunk
- D. Three cords

Brachial plexus is composed of five roots, three trunks (upper, middle, & lower), with two divisions (anterior & posterior) per trunk. Trunks divide into three cords (medial, lateral, & posterior).

1712 Parsonage-Turner syndrome relates best with ?

Harrison's 18th Ed. 3470

- A. Brachial Plexus
- B. Lumbosacral Plexus
- C. Radiation-Induced Plexopathy
- D. Peroneal Neuropathy

Immune-mediated brachial plexus neuropathy (IBPN) is also called acute brachial plexitis, neuralgic amyotrophy and Parsonage - Turner syndrome.

1713 Pain in immune-mediated brachial plexus neuropathy (IBPN) is at ?

Harrison's 18th Ed. 3470

- A. Neck
- B. Shoulder
- C. Arm
- D. Hand

IBPN usually presents with an acute onset of severe pain in the shoulder region.

1714 Out of the following, which is most commonly involved in IBPN ?

Harrison's 18th Ed. 3470

- A. Root
- B. Trunk
- C. Division
- D. Cord

Most common pattern of IBPN involves the upper trunk or a single or multiple mononeuropathies primarily involving the suprascapular, long thoracic, or axillary nerves.

1715 Which of the following surgical procedures is the most common cause of brachial plexopathy ?

Harrison's 18th Ed. 3470

- A. Reduction of subluxated shoulder
- B. Repair of fracture of neck of humerus
- C. Median sternotomy
- D. Repair of fracture of clavicle

Most common surgical procedures associated with brachial plexopathy as a complication are those that involve median sternotomies.

1716 Which of the following is false about electrodiagnostic features of demyelination ?

Harrison's 16th Ed. 2506

- A. Slowing of nerve conduction velocity (NCV)
- B. Dispersion of evoked compound action potentials
- C. Conduction block & prolongation of distal latencies
- D. None of the above

1717 Mononeuropathy multiplex syndrome may be a manifestation of all except ?

Harrison's 16th Ed. 2507

- A. Leprosy
- B. Sarcoidosis
- C. Syphilis
- D. NeuroAIDS

1718 Example of motor neuronopathies include ?

Harrison's 16th Ed. 2509

- A. Lower-motor form of amyotrophic lateral sclerosis
- B. Poliomyelitis
- C. Hereditary spinal muscular atrophies
- D. All of the above

1719 Example of motor neuronopathies include ?

Harrison's 16th Ed. 2509

- A. Lead intoxication
- B. Dapsone intoxication
- C. Porphyria
- D. All of the above

1720 Peripheral neuropathy includes disorders of ?

Harrison's 17th Ed. 2651

- A. Peripheral nerves
- B. Dorsal or ventral nerve roots
- C. Dorsal root ganglia
- D. All of the above

Peripheral neuropathy includes disorders of peripheral nerves, dorsal or ventral nerve roots, dorsal root ganglia, brachial or lumbosacral plexus, cranial nerves (except I & II) & other sensory, motor, autonomic or mixed nerves.

1721 Electrodiagnostic studies (EDx) help to diagnose which of the following neuropathies ?

Harrison's 17th Ed. 2651

- A. Axonal
- B. Demyelinating
- C. Neuronal
- D. All of the above

Electrodiagnostic studies help to classify neuropathy into either axonal, demyelinating or neuronal.

1722 Which of the following is false about peripheral neuropathy ?

Harrison's 17th Ed. 2651

- A. Sensory symptoms precede motor symptoms
- B. Small-fiber neuropathies present with paresthesias
- C. Large-fiber neuropathies present as gait disturbance
- D. None of the above

1723 Term ataxic-neuropathy is used for ?

Harrison's 17th Ed. 2653 Table 379-3

- A. Small-fiber sensory neuropathies
- B. Large-fiber sensory neuropathies
- C. Motor-predominant neuropathies
- D. Autonomic neuropathies

1724 Which of the following is not a small-fiber sensory neuropathy ?

Harrison's 17th Ed. 2653 Table 379-3

- A. Amyloidosis
- B. Lepromatous leprosy
- C. HIV & antiretroviral therapy neuropathy
- D. Friedreich's ataxia

1725 Which of the following is not a large-fiber sensory neuropathy ?

Harrison's 17th Ed. 2653 Table 379-3

- A. Sjögren's syndrome
- B. Fabry's disease

- C. Cisplatin neuropathy
- D. Pyridoxine toxicity

1726 Which of the following is a motor-predominant neuropathy ?

Harrison's 17th Ed. 2653 Table 379-3

- A. Acute intermittent porphyria
- B. Diphtheritic neuropathy
- C. Lead neuropathy
- D. All of the above

1727 Which of the following is a neuronal neuropathy ?

Harrison's 17th Ed. 2653 Table 379-4

- A. Sjögren's syndrome
- B. Cisplatin toxicity
- C. Pyridoxine toxicity
- D. All of the above

1728 Which of the following is not a demyelinating neuropathy ?

Harrison's 17th Ed. 2653 Table 379-4

- A. Guillain-Barré syndrome
- B. Multifocal motor neuropathy (MMN)
- C. HIV neuropathy
- D. Diphtheria neuropathy

1729 Which of the following is not a axonal neuropathy ?

Harrison's 17th Ed. 2653 Table 379-4

- A. Toxic
- B. HIV
- C. Charcot-Marie-Tooth 2 (CMT2)
- D. All of the above

Most toxic neuropathies are distal axonal degenerations. In HIV, length-dependent axonal degeneration of sensory fibers without nerve-fiber regeneration occurs.

1730 Which of the following is a acute onset neuropathy ?

Harrison's 17th Ed. 2653 Table 379-5

- A. Porphyria
- B. Diphtheria
- C. Guillain-Barré syndrome
- D. All of the above

1731 Which of the following is a recurrent neuropathy ?

Harrison's 17th Ed. 2653 Table 379-5

- A. Porphyria
- B. Refsum's disease
- C. Hereditary neuropathy with pressure palsies (HNPP)
- D. All of the above

385 - Guillain-Barré syndrome (GBS)

1732 Guillain-Barré syndrome was first described in which year ?

N Engl J Med 2012;366:2294-304

- A. 1869
- B. 1898
- C. 1916

D. 1934

Guillain-Barré syndrome, characterized by acute areflexic paralysis with albuminocytologic dissociation (elevated protein in CSF and normal cell counts), was described in 1916.

1733 Miller Fisher syndrome was first reported in which year ?

N Engl J Med 2012;366:2294-304

- A. 1923
- B. 1943
- C. 1956
- D. 1966

Miller Fisher syndrome, characterized by ophthalmoplegia, ataxia & areflexia, was reported in 1956 as a likely variant of Guillain-Barré syndrome, because the CSF of affected patients showed albuminocytologic dissociation.

1734 Feature not typical of Guillain-Barre syndrome is ?

Harrison's 17th Ed. 2667, Harrison's 18th Ed. 3473

- A. Acute onset
- B. Males & females are at equal risk
- C. Autoimmune
- D. Polyradiculoneuropathy

Males are at 1.5-fold higher risk for GBS than females. Adults are more frequently affected than children.

1735 Facial diparesis is present in what proportion of GBS patients ?

Harrison's 18th Ed. 3473

- A. 10 %
- B. 20 %
- C. 50 %
- D. 80 %

Facial diparesis is present in 50% of GBS patients.

1736 Which of the following is not typical of Guillain-Barre syndrome ?

Harrison's 18th Ed. 3473

- A. Fever & constitutional symptoms are absent at onset
- B. Lower cranial nerves are frequently involved
- C. DTRs disappear within first few days of onset
- D. Bladder dysfunction is a prominent feature

Presence of fever & constitutional symptoms at onset cast doubt on the diagnosis of GBS. Transient bladder dysfunction may occur in severe GBS. If bladder dysfunction is a prominent & early in the course, GBS is unlikely.

1737 In GBS, clinical worsening reaches a plateau in how many weeks of onset ?

Harrison's 18th Ed. 3473

- A. 1 week
- B. 4 weeks
- C. 8 weeks
- D. 12 weeks

Clinical worsening stops and GBS patient reaches a plateau almost always within 4 weeks of onset.

1738 Limited or regional GBS syndromes include ?

Harrison's 18th Ed. 3473

- A. Acute motor axonal neuropathy (AMAN)
- B. Acute motor sensory axonal neuropathy (AMSAN)

C. Miller Fisher syndrome (MFS)

D. All of the above

Limited or regional GBS syndromes are Miller Fisher syndrome, pure sensory forms, ophthalmoplegia with anti-GQ1b antibodies (severe motor-sensory GBS), GBS with severe bulbar & facial paralysis associated with cytomegalovirus (CMV) infection & anti-GM2 antibodies & acute pandysautonomia.

1739 Which of the following is the most common form of GBS ?

Harrison's 18th Ed. 3473

- A. Acute inflammatory demyelinating polyradiculoneuropathy
- B. Acute axonal motor disorder
- C. Acute sensory & motor axonal neuropathy
- D. Miller Fisher syndrome (MFS)

In Europe & North America ~95% of GBS are acute inflammatory demyelinating polyradiculoneuropathy. ~5% are AMAN & AMSAN.

1740 Nationality of Charles Miller Fisher was ?

- A. Canadian
- B. American
- C. British
- D. Brazilian

Charles Miller Fisher was a Canadian stroke specialist.

1741 Which of the following is a demyelinating disorder ?

Harrison's 18th Ed. 3473

- A. Acute motor axonal neuropathy (AMAN)
- B. Acute motor sensory axonal neuropathy (AMSAN)
- C. Miller Fisher syndrome (MFS)
- D. All of the above

Acute motor axonal neuropathy (AMAN) and acute motor sensory axonal neuropathy (AMSAN) subtypes are axonal variants of Guillain-Barré syndrome (GBS).

1742 Organisms involved in antecedent infections in Guillain-Barre syndrome include ?

Harrison's 18th Ed. 3474, N Engl J Med 2012;366:2294-304

- A. Campylobacter jejuni
- B. Human herpes virus
- C. Cytomegalovirus
- D. All of the above

~70% of GBS occur 1-3 weeks after an acute infectious process (respiratory or gastrointestinal). Antecedent infection or reinfection with Campylobacter jejuni, human herpes virus infection, CMV or Epstein-Barr virus & Mycoplasma pneumoniae have been identified.

1743 Which of the following vaccinations could predispose to Guillain-Barre syndrome ?

Harrison's 18th Ed. 3474

- A. Swine influenza vaccine
- B. Influenza vaccine
- C. Older type rabies vaccine
- D. All of the above

Immunizations with swine influenza vaccine, influenza vaccines and older-type rabies vaccine are implicated as a trigger of GBS. There is no increased risk of GBS with meningococcal vaccinations.

1744 Guillain-Barre syndrome occurs more frequently in patients with following diseases except ?

Harrison's 18th Ed. 3474

- A. Hodgkin's disease

- B. Chronic myeloid leukemia
- C. HIV-seropositive individuals
- D. Systemic lupus erythematosus

GBS also occurs more frequently in patients with lymphoma (Hodgkin's disease), HIV-seropositive individuals and in patients with SLE.

1745 Which of the following statements is false about GBS ?

Harrison's 18th Ed. 3474

- A. Both cellular & humoral immune mechanisms involved
- B. Analogous to experimental allergic neuritis (EAN)
- C. Molecular mimicry mechanism
- D. None of the above

1746 Which of the following is the critical event in the development of GBS ?

Harrison's 18th Ed. 3474 Figure 385-1

- A. B cells recognize glycoconjugates on C. jejuni
- B. Activation of B cells T cell
- C. Escape of activated B cells from Peyer's patches into regional lymph nodes
- D. All of the above

In the immunopathogenesis of GBS, a critical event in the development of GBS is the escape of activated B cells from Peyer's patches into regional lymph nodes.

1747 Which of the following is false about Miller Fisher syndrome ?

Harrison's 18th Ed. 3475

- A. Anti-GQ1b antibodies are found in > 90% patients
- B. IgG titers are highest early in the course
- C. Areflexia of limbs without weakness
- D. None of the above

Anti-GQ1b IgG antibodies are found in >90% of patients with MFS, and titers of IgG are highest early in the course. Anti-GQ1b antibodies are not found in other forms of GBS unless there is extraocular motor nerve involvement.

1748 Which of the following antiganglioside antibody is common in GBS ?

Harrison's 18th Ed. 3475 Table 385-2

- A. Anti GM1
- B. Anti GM2
- C. Anti GM3
- D. Anti GM4

Anti GM1, an antiganglioside antibody is common in GBS (20 - 50%), particularly in those preceded by C. jejuni infection.

1749 Which of the following is most relevant to Gangliosides ?

N Engl J Med 2012;366:2294-304

- A. Lectin
- B. Heparan
- C. Ceramide
- D. Mannose

Gangliosides are composed of a ceramide attached to one or more sugars (hexoses) and contain sialic acid (N-acetylneuraminic acid) linked to an oligosaccharide core. Gangliosides are important components of the peripheral nerves.

1750 Which of the following is a Ganglioside ?

N Engl J Med 2012;366:2294-304

- A. GM1

- B. GD1a
- C. GT1a
- D. All of the above

GM1, GD1a, GT1a, and GQ1b are gangliosides.

1751 Which of the following is a central nervous system variant of Miller Fisher syndrome ?

N Engl J Med 2012;366:2294-304

- A. Anti-Hu-Associated Paraneoplastic Encephalitis (PEM)
- B. Bickerstaff's brain-stem encephalitis
- C. Post-infectious brainstem encephalitis
- D. All of the above

Antibodies against ganglioside GQ_{1b} have also been detected in patients with Bickerstaff's brainstem encephalitis. Bickerstaff's encephalitis is characterized by ophthalmoplegia and ataxia but is also accompanied by pyramidal and sensory tract findings and cerebrospinal fluid pleocytosis.

1752 Which of the following gangliosides is strongly expressed at the nodes of Ranvier ?

N Engl J Med 2012;366:2294-304

- A. GM1
- B. GT1a
- C. GQ1b
- D. All of the above

Gangliosides GM1 and GD1a are strongly expressed at the nodes of Ranvier, where voltage-gated sodium (Nav) channels are localized. Contactin associated protein (Caspr) & voltage-gated potassium (Kv) channels are present at paranodes and juxtaparanodes respectively. IgG anti-GM1 or anti-GD1a autoantibodies bind to the nodal axolemma, leading to membrane-attack complex (MAC) formation. This results in disappearance of Nav clusters and detachment of paranodal myelin, which can lead to nerve-conduction failure and muscle weakness.

1753 IgG autoantibodies to GQ1b cross-react with which of the following ?

N Engl J Med 2012;366:2294-304

- A. GM1
- B. GD1a
- C. GT1a
- D. All of the above

IgG autoantibodies to GQ1b, which cross-react with GT1a, are strongly associated with the Miller Fisher syndrome, its incomplete forms (acute ophthalmoparesis and acute ataxic neuropathy), and its CNS variant, Bickerstaff's brain-stem encephalitis (acute ophthalmoplegia, ataxia, and impaired consciousness after an infectious episode).

1754 The anti-GQ1b antibody syndrome includes which of the following ?

N Engl J Med 2012;366:2294-304

- A. Bickerstaff's brain-stem encephalitis
- B. Miller Fisher syndrome
- C. Pharyngeal-cervical-brachial weakness
- D. All of the above

The anti-GQ1b antibody syndrome includes the Miller Fisher syndrome, acute ophthalmoparesis, acute ataxic neuropathy, Bickerstaff's brain-stem encephalitis, and pharyngeal-cervical-brachial weakness.

1755 GQ1b is strongly expressed in which of the following cranial nerves ?

N Engl J Med 2012;366:2294-304

- A. Oculomotor nerve
- B. Trochlear nerve
- C. Abducens nerve

D. All of the above

GQ1b is strongly expressed in the oculomotor, trochlear, and abducens nerves, as well as muscle spindles in the limbs. Glossopharyngeal and vagus nerves strongly express GT1a and GQ1b, possibly accounting for dysphagia.

1756 In demyelinating GBS, basis for flaccid paralysis & sensory disturbance is ?

Harrison's 18th Ed. 3475

- A. Conduction block
- B. Neurodegeneration
- C. Apoptosis
- D. All of the above

In demyelinating forms of GBS, basis for flaccid paralysis & sensory disturbance is conduction block. Secondary axonal degeneration usually occurs in severe cases.

1757 CSF findings in Guillain-Barre syndrome include all except ?

Harrison's 18th Ed. 3476

- A. Elevated CSF proteins
- B. CSF protein elevated by end of first week
- C. No pleocytosis
- D. CSF is normal when symptoms are present for < 6 hours

CSF is often normal when symptoms have been present for 48 hours. By the end of first week the level of protein is usually elevated without accompanying pleocytosis. Sustained CSF pleocytosis suggests an alternative diagnosis.

1758 In CSF of GBS patient, increase in which of the following reflects axonal damage & predicts a residual deficit ?

Harrison's 18th Ed. 3476

- A. Tau
- B. Amyloid precursor protein (APP)
- C. Chymotrypsin
- D. Apolipoprotein E

Tau & 14-3-3 protein levels are elevated early in some cases of GBS. Tau increases in CSF may reflect axonal damage & predict a residual deficit.

1759 Differential diagnosis of Guillain-Barré syndrome includes ?

Harrison's 18th Ed. 3476

- A. Hypokalaemia
- B. Polymyositis
- C. Porphyria
- D. All of the above

Differential diagnosis of Guillain-Barré syndrome include transverse myelitis & neuromyelitis optica, Lyme polyradiculitis, porphyria, vasculitic neuropathy, poliomyelitis, West Nile virus, CMV polyradiculitis, critical illness neuropathy or myopathy, myasthenia gravis, botulism, poisonings with organophosphates, thallium, or arsenic, paralytic shellfish poisoning, severe hypophosphatemia.

1760 What length of time after the first motor symptoms in GBS, immunotherapy is no longer effective ?

Harrison's 18th Ed. 3477

- A. 3 days
- B. 14 days
- C. 30 days
- D. 60 days

Each day counts in the treatment of GBS. ~2 weeks after first motor symptoms, immunotherapy is no longer effective.

1761 Which of the following about treatment of GBS is false ?

Harrison's 18th Ed. 3477

- A. High-dose IVIg & plasmapheresis are equally effective
- B. Combination of IVIg & plasmapheresis offers no advantage
- C. After successful treatment of GBS, relapse may occur in II or III week
- D. None of the above

IVIg is administered as five daily infusions for a total dose of 2 g/kg body weight. A course of plasmapheresis usually consists of 40–50 mL/kg plasma exchange (PE) four to five times over a week. Glucocorticoids have not been found to be effective in GBS. 30% of patients with GBS require ventilatory assistance.

1762 Which of the following is not found in Miller Fisher syndrome ?

Harrison's 17th Ed. 2667

- A. Ataxia
- B. Areflexia of limbs
- C. Weakness of limbs
- D. Ophthalmoplegia

1763 Which of the following is false about Miller Fisher syndrome ?

Harrison's 17th Ed. 2667

- A. Rapidly evolving ataxia
- B. Areflexia of limbs without weakness
- C. Ophthalmoplegia often with pupillary paralysis
- D. None of the above

1764 MFS is strongly associated with which of the following antibodies ?

Harrison's 17th Ed. 2667

- A. GQ1a
- B. GQ1b
- C. GQ1c
- D. GQ1d

Miller Fisher syndrome (MFS) presents as rapidly evolving ataxia & areflexia of limbs without weakness, and ophthalmoplegia, often with pupillary paralysis. MFS is strongly associated with antibodies to ganglioside GQ1b.

1765 Which of the following statements about Gullain-Barre syndrome (GBS) is false ?

Harrison's 18th Ed. 3477

- A. Escape of activated B cells from Peyer patches into regional lymph nodes
- B. Anti GQ1b IgG antibodies are found in >90% of patients with Miller Fisher subtype of GBS
- C. Glucocorticoids are effective in GBS
- D. Severe proximal motor & sensory axonal damage is a poor prognostic sign

Glucocorticoids have not been found to be effective in GBS. CIDP responds to glucocorticoids, whereas GBS does not.

1766 Classic chronic inflammatory demyelinating polyneuropathy is characterized by all except ?

N Engl J Med 2005;352:1343-56

- A. Symmetrical weakness in proximal muscles
- B. Symmetrical weakness in distal muscles
- C. Weakness progressively increases for > 2 months
- D. Not associated with impaired sensation

1767 Which of the following electrodiagnostic findings is not a feature of Classic chronic inflammatory demyelinating polyneuropathy ?

Harrison's 18th Ed. 3477, N Engl J Med 2005;352:1343-56

- A. Partial motor-nerve conduction block
- B. Reduced motor-nerve conduction velocity
- C. Prolonged distal motor latencies
- D. Absent F-wave latencies

Edx findings in CIDP reveal variable degrees of conduction slowing, prolonged distal latencies, distal and temporal dispersion of CMAPs, and conduction block as the principal features. Presence of conduction block is a certain sign of an acquired demyelinating process. Evidence of axonal loss, presumably secondary to demyelination, is present in >50% of patients.

1768 Chronic inflammatory demyelinating polyneuropathy may be associated with all of the following except ?

Harrison's 18th Ed. 3477

- A. HIV
- B. SLE
- C. Diabetes mellitus
- D. Hypothyroidism

In all patients with presumptive CIDP, it is also reasonable to exclude vasculitis, collagen vascular disease (SLE), chronic hepatitis, HIV infection, amyloidosis, diabetes mellitus, inflammatory bowel disease and lymphoma.

1769 Which of the following treatments is effective in CIDP ?

Harrison's 18th Ed. 3478

- A. High-dose IVIg
- B. Plasma exchange (PE)
- C. Glucocorticoids
- D. All of the above

Controlled studies have shown that high-dose IVIg, PE, and glucocorticoids are all more effective than placebo. Patients who fail therapy with IVIg, PE & glucocorticoids may benefit from treatment with azathioprine, methotrexate, cyclosporine, cyclophosphamide, and anti-CD20 (rituximab).

1770 Lewis-Sumner Syndrome is ?

Harrison's 18th Ed. 3477, N Engl J Med 2005;352:1343-56

- A. Multifocal Acquired Demyelinating Sensory and Motor Neuropathy
- B. Multifocal Motor Neuropathy
- C. Distal Acquired Demyelinating Symmetric Neuropathy
- D. Motor neuron disease

Lewis-Sumner syndrome is also called multifocal acquired demyelinating sensory and motor (MADSAM) neuropathy. It is a variant of CIDP in which discrete peripheral nerves are involved.

1771 Lewis-Sumner Syndrome is characterized by all except ?

Harrison's 18th Ed. 3477, N Engl J Med 2005;352:1343-56

- A. Motor and sensory deficits
- B. Elevated CSF protein content
- C. Asymmetrical presentation of symptoms
- D. Poor response to intravenous immune globulin in presence of antibodies to gangliosides

Weakness of the limbs is usually symmetric in CIDP, but can be strikingly asymmetric in Lewis-Sumner syndrome.

1772 Intravenous immune globulin has been established to be efficacious in ?

N Engl J Med 2001;345:747, Harrison's 18th Ed. 2684

- A. Guillain-Barré syndrome

- B. Chronic inflammatory demyelinating polyneuropathy
- C. Myasthenia gravis
- D. All of the above

1773 Intravenous immune globulin has been established to be efficacious in ?

N Engl J Med 2001;345:747

- A. Corticosteroid-resistant dermatomyositis
- B. Kawasaki's syndrome
- C. GVHD prevention in allogeneic BM transplants
- D. All of the above

IVIg blocks reticuloendothelial cell function and immune complex clearance in immune thrombocytopenia. In addition, IVIg is useful for prevention of tissue damage in certain inflammatory syndromes such as Kawasaki disease and as Ig replacement therapy for certain types of immunoglobulin deficiencies. IVIg is also useful in selected patients with graft-versus-host disease, multiple sclerosis, myasthenia gravis, Guillain-Barré syndrome, and chronic demyelinating polyneuropathy.

1774 The mode of action of immune globulin involves ?

N Engl J Med 2001;345:747

- A. Modulation of expression & function of Fc receptors
- B. Interference with activation of complement & cytokines
- C. Provision of antiidiotypic antibodies
- D. All of the above

1775 The half-life of infused immune globulin in immunocompetent persons is ?

N Engl J Med 2001;345:747

- A. Two weeks
- B. Three weeks
- C. Four weeks
- D. Five weeks

1776 Most natural autoantibodies in adult serum are of ?

N Engl J Med 2001;345:747

- A. IgG class
- B. IgM class
- C. IgA class
- D. All of the above

1777 Which of the following about total dose of Intravenous immune globulin is true ?

N Engl J Med 2012;366:2294-304

- A. 1 grams per kilogram over 3 days
- B. 1 grams per kilogram over 5 days
- C. 2 grams per kilogram over 3 days
- D. 2 grams per kilogram over 5 days

Intravenous immune globulin has replaced plasma exchange as the treatment of choice in GBS patients who are not able to walk unaided. Immune globulin is given at a total dose of 2 grams per kilogram of body weight over a period of 5 days.

1778 Which of the following is true regarding definition of partial nerve conduction block ?

Harrison's 18th Ed. 3478, N Engl J Med 2005;352:1343-56

- A. Drop of 20% or more in negative peak area
- B. Drop of 20% or more in peak-to-peak amplitude
- C. Change of <15% in duration between proximal & distal site stimulation

D. All of the above

1779 Which of the is false about Multifocal Motor Neuropathy ?

Harrison's 18th Ed. 3478, N Engl J Med 2005;352:1343-56

- A. Symmetric weakness
- B. Relative sparing of sensory fibres
- C. Starts in distal arm muscles
- D. A partial motor-conduction block at multiple sites

Multifocal motor neuropathy (MMN) presents as slowly progressive motor weakness & atrophy evolving over years in the distribution of selected nerve trunks, associated with sites of persistent focal motor conduction block in the same nerve trunks. Sensory fibers are relatively spared. The arms are affected more frequently than the legs, and >75% of all patients are male.

1780 Which of the following is effective in the treatment of Multifocal Motor Neuropathy ?

Harrison's 18th Ed. 3478, N Engl J Med 2005;352:1343-56

- A. Corticosteroids
- B. Plasma exchange (PE)
- C. Immune globulin therapy
- D. Methotrexate

1781 Which of the following is effective in the treatment of Multifocal Motor Neuropathy ?

Harrison's 18th Ed. 3478, N Engl J Med 2005;352:1343-56

- A. Corticosteroids
- B. Plasma exchange (PE)
- C. Cyclophosphamide
- D. Methotrexate

Most patients with Multifocal motor neuropathy (MMN) respond to high-dose IVIg. Refractory patients may respond to rituximab or cyclophosphamide. Glucocorticoids and PE are not effective.

386 - Myasthenia Gravis and Diseases of the Neuromuscular Junction

1782 Myasthenia gravis (MG) is a neuromuscular disorder involving ?

Harrison's 18th Ed. 3480

- A. Skeletal muscle
- B. Smooth muscle
- C. Cardiac muscle
- D. All of the above

MG is a neuromuscular disorder characterized by weakness & fatigability of skeletal muscles.

1783 At neuromuscular junctions in myasthenia gravis, the defect in acetylcholine receptors (AChRs) is ?

Harrison's 18th Ed. 3480

- A. Decrease in their number
- B. Decrease in their size
- C. Alteration in their shape
- D. All of the above

In MG, underlying pathogenetic defect is decrease in number of available AChRs at neuromuscular junctions due to antibody-mediated autoimmune attack.

1784 Which of the following is false about neuromuscular junction in MG ?

Harrison's 18th Ed. 3480 Figure 386-1

- A. Normal nerve terminal

B. Flattened, simplified postsynaptic folds

C. Widened synaptic space

D. None of the above

In MG, NM junction has a normal nerve terminal, reduced number of AChRs (stippling), flattened, simplified postsynaptic folds, & widened synaptic space.

1785 Structure of AChR consists of ?

Harrison's 18th Ed. 3480

- A. 1-alpha, 2-beta, 1-delta, and 1-gamma or epsilon
- B. 1-alpha, 1-beta, 2-delta, and 1-gamma or epsilon
- C. 1-alpha, 1-beta, 1-delta, and 2-gamma or epsilon
- D. 2-alpha, 1-beta, 1-delta, and 1-gamma or epsilon

Structure of AChR consists of five subunits - 2-alpha, 1-beta, 1-delta, and 1-gamma or epsilon arranged around a central pore.

1786 Which of the following about Myasthenia gravis is false ?

Harrison's 16th Ed. 2518

- A. Acetylcholine receptor consists of five subunits - 1 alpha, 2beta, 1gamma, 1delta or 1epsilon
- B. Pathologic antibodies are IgG & are T cell dependent
- C. Absence of anti AChR antibodies does not exclude diagnosis
- D. Mycophenolate mofetil is useful

1787 With the opening of the channel in AChR, which of the following cation gains rapid entry ?

Harrison's 18th Ed. 3480

- A. Sodium
- B. Potassium
- C. Calcium
- D. Magnesium

ACh combines with binding sites on alpha subunits of AChR to open the channel permitting rapid entry of cations, chiefly sodium.

1788 Acetylcholinesterase (AChE) rapidly terminates the action of ACh by ?

Harrison's 18th Ed. 3480

- A. Oxidation
- B. Reduction
- C. Hydrolysis
- D. Phosphorylation

Acetylcholinesterase (AChE) rapidly terminates the action of acetylcholine (ACh) by hydrolysis.

1789 Which of the following about myasthenia gravis is false ?

Harrison's 18th Ed. 3480

- A. ACh is released normally
- B. Decrease in number of available ACh receptors
- C. Increased presynaptic rundown
- D. Thymus abnormal in ~ 75 % of patients

Amount of ACh released per impulse normally declines on repeated activity (presynaptic rundown). In MG, this normal rundown along with decreased efficiency of NM transmission results in weakness or myasthenic fatigue. Thymus is abnormal in ~75% of patients with MG.

1790 In MG, the autoimmune antibody is targeted against ?

Harrison's 18th Ed. 3480

- A. Acetylcholine
- B. Acetylcholine receptor (AChR)

- C. Acetylcholinesterase (AChE)
- D. All of the above

In MG, specific anti-AChR autoimmune antibody is targetted against Acetylcholine receptor (AChR).

1791 In MG, anti-AChR antibodies reduce the number of available AChRs at NM junctions by which mechanism ?

Harrison's 18th Ed. 3480

- A. Endocytosis of the receptors
- B. Blockade of the active site of AChR
- C. Damage to postsynaptic muscle membrane
- D. All of the above

Anti-AChR antibodies reduce the number of available AChRs at NM junctions by accelerated turnover of AChRs by its rapid endocytosis, blockade of the active binding site of AChR, and damage to postsynaptic muscle membrane by the antibody + complement.

1792 Pathogenic anti-AChR antibody in myasthenia gravis is ?

Harrison's 18th Ed. 3480

- A. IgA
- B. IgG
- C. IgM
- D. IgE

In MG, the pathogenic antibodies are IgG & are T cell dependent.

1793 Thymus is abnormal in what proportion of patients with MG ?

Harrison's 18th Ed. 3480

- A. 25 %
- B. 50 %
- C. 75 %
- D. 100 %

Thymus is abnormal in 75% of patients with MG. In 65%, thymus is "hyperplastic" though not necessarily enlarged. 10% of patients have thymic tumors (thymomas). Muscle-like cells within the thymus (myoid cells), which bear AChRs on their surface, may serve as a source of autoantigen and trigger the autoimmune reaction within thymus gland.

1794 Thymoma along with which of the following is called Good's syndrome ?

- A. Pure red cell aplasia
- B. Hypogammaglobulinemia
- C. Systemic lupus erythematosus
- D. Ulcerative colitis

Thymoma with hypogammaglobulinemia also is called Good's syndrome.

1795 Staging system for thymomas is named after ?

- A. Atkin
- B. Falkson
- C. Masaoka
- D. Tomaszek

The staging system for thymoma was developed by Masaoka and colleagues.

1796 Thymoma and / or myasthenia gravis is associated with which of the following ?

Harrison's 18th Ed. 426

- A. Pemphigus Vulgaris
- B. Pemphigus Foliaceus
- C. Paraneoplastic Pemphigus
- D. Bullous Pemphigoid

1797 In myasthenia gravis, which of the following spirometric statement is false ?

Harrison's 18th Ed. 2093

- A. Normal FRC
- B. Low TLC
- C. Elevated RV
- D. Normal FVC

In MG, FRC remains normal, as both lung recoil & passive chest wall recoil are normal. TLC is low and RV is elevated, as respiratory muscle strength is insufficient. Caught between the low TLC and the elevated RV, FVC and FEV₁ are reduced as "innocent bystanders." As airway size and the lung vasculature are unaffected, both airways resistance (R_{aw}) and DL_{CO} are normal.

1798 Type of respiratory failure in MG is usually ?

Harrison's 18th Ed. 2200

- A. Type I
- B. Type II
- C. Type III
- D. Type IV

In myasthenia gravis, reduced strength due to impaired neuromuscular transmission results in type II respiratory failure i.e. alveolar hypoventilation and inability to eliminate carbon dioxide effectively.

1799 Myasthenia gravis is related to which of the following ?

Harrison's 18th Ed. Chap. 387

- A. Neuromyelitis optica (NMO)
- B. M component on electrophoretic analysis
- C. Hyperthyroidism
- D. All of the above

1800 Which of the following about myasthenia gravis is false ?

Harrison's 18th Ed. 3480

- A. Women more affected than men
- B. Lids & extraocular muscles involved early
- C. Limb weakness is proximal and asymmetric
- D. Deep tendon reflexes diminished

Women are affected more frequently than men, in a ratio of ~3:2. Cranial muscles, particularly lids & extraocular muscles are involved early in MG. Diplopia & ptosis are common initial complaints. Limb weakness is proximal & asymmetric. Deep tendon reflexes are preserved.

1801 Fluctuating ptosis that worsens late in the day is typical of ?

Harrison's 18th Ed. 237

- A. Myasthenia gravis
- B. Glaucoma
- C. Optic nerve glioma
- D. Orbital cellulitis

Fluctuating ptosis that worsens late in the day is typical of myasthenia gravis.

1802 Which of the following is an eye related finding in myasthenia gravis ?

Harrison's 18th Ed. 238

- A. Pupils are always normal
- B. Diplopia is intermittent & variable
- C. Diplopia is not confined to any single ocular motor nerve
- D. None of the above

MG is a major cause of diplopia which is intermittent, variable, and not confined to any single ocular motor nerve distribution. Pupils are always normal. Fluctuating ptosis may be present.

1803 Cause of episodic generalized weakness is ?

Harrison's 18th Ed. 185 Table 22-2

- A. Myasthenia gravis
- B. Lambert-Eaton myasthenic syndrome
- C. Multiple sclerosis
- D. All of the above

Causes of episodic generalized weakness include Electrolyte disturbances (hypokalemia, hyperkalemia, hypercalcemia, hypernatremia, hyponatremia, hypophosphatemia, hypermagnesemia), Muscle disorders (periodic paralyses, metabolic defects of muscle), Neuromuscular junction disorders (Myasthenia gravis, Lambert-Eaton myasthenic syndrome), Central nervous system disorders (Transient ischemic attacks of the brainstem, Transient global cerebral ischemia, Multiple sclerosis).

1804 MG muscle weakness will not become generalized if it remains restricted to extraocular muscles for ?

Harrison's 18th Ed. 3481

- A. 6 months
- B. 1 year
- C. 2 years
- D. 3 years

In MG, if muscle weakness remains restricted to extraocular muscles for 3 years (ocular MG), it is unlikely to become generalized.

1805 Which of the following is false about MG ?

Harrison's 18th Ed. 3481

- A. No loss of reflexes
- B. No impairment of sensation
- C. No HMF neurologic defect
- D. None of the above

MG is characterized by typical distribution of skeletal muscle weakness & fatigability, without loss of reflexes or impairment of sensation or other neurologic function.

1806 In seronegative MG, antibodies can be found against ?

Harrison's 18th Ed. 3481

- A. Muscle-specific tyrosine kinase
- B. Myasthenia-specific tyrosine kinase
- C. Membrane-specific tyrosine kinase
- D. None of the above

Presence of anti-AChR antibodies is diagnostic of MG, but a negative test does not exclude MG. Antibodies to muscle-specific tyrosine kinase (MuSK) are present in ~40% of AChR antibody-negative patients with generalized MG.

1807 Anti-AChR antibodies are detectable in what percentage of all myasthenic patients ?

Harrison's 18th Ed. 3481

- A. ~ 45 %
- B. ~ 65 %
- C. ~ 85 %
- D. ~ 99 %

1808 Anti-AChR antibodies are detectable in what percentage of ocular MG patients ?

Harrison's 18th Ed. 3481

- A. ~ 25 %
- B. ~ 50 %
- C. ~ 75 %
- D. ~ 99 %

Anti-AChR antibodies are detectable in ~85% of all MG patients & in only ~50% of ocular MG patients.

1809 Anti-MuSK antibodies are found in what percentage of AChR antibody-negative patients with generalized MG ?

Harrison's 18th Ed. 3481

- A. ~ 10 %
- B. ~ 40 %
- C. ~ 80 %
- D. ~ 100 %

~40% of AChR antibody-negative patients with generalized MG have anti-MuSK antibodies.

1810 Anti MuSK antibodies are present in what percentage of AChR antibody-positive MG patients ?

Harrison's 18th Ed. 3481

- A. Rare
- B. 25 %
- C. 50 %
- D. 80 %

1811 Anti MuSK antibodies are present in what percentage of patients with MG limited to ocular muscles ?

Harrison's 18th Ed. 3481

- A. Rare
- B. 25 %
- C. 50 %
- D. 80 %

MuSK antibodies are rarely present in AChR antibody-positive MG patients or in patients with MG limited to ocular muscles.

1812 Which of the following statements about antibodies to muscle-specific kinase (MuSK) is false ?

Harrison's 18th Ed. 3481

- A. Found in ~40% of AChR antibody-negative generalized MG
- B. Not present in AChR antibody-positive patients
- C. Not present in MG limited to ocular muscles
- D. None of the above

1813 It is best to test which of the following muscles in repetitive nerve stimulation for evidence of MG ?

Harrison's 18th Ed. 3481

- A. Proximal muscle groups
- B. Distal muscle groups
- C. Interosseous muscles
- D. Any of the above

It is best to test weak muscles or proximal muscle groups in repetitive nerve stimulation for evidence of MG. Anti-AChE medication must be stopped 6 - 24 hours before testing.

1814 In myasthenic patients, rapid reduction of what proportion in amplitude of evoked responses is noted ?

Harrison's 18th Ed. 3481

- A. > 10 - 15 %
- B. > 20 - 30 %
- C. > 30 - 45 %
- D. > 50 - 75 %

in repetitive nerve stimulation for evidence of MG, electric shocks are delivered at a rate of two

or three per second to the appropriate nerves, and action potentials are recorded from muscles. In myasthenic patients there is a rapid reduction of > 10 - 15% in the amplitude of the evoked responses.

1815 Which of the following drug must be kept at hand while conducting Edrophonium anticholinesterase test ?

Harrison's 18th Ed. 3481

- A. Atropine
- B. Neostigmine
- C. Adrenaline
- D. All of the above

Atropine (0.6 mg) should be drawn up in a syringe, ready for IV use if nausea, diarrhea, salivation, fasciculations, syncope or bradycardia develop following IV edrophonium.

1816 Apart from Edrophonium which drug can be used for Anticholinesterase Test ?

Harrison's 18th Ed. 3481

- A. Atropine
- B. Neostigmine
- C. Adrenaline
- D. All of the above

A longer acting drug like neostigmine (orally) may be used for anticholinesterase test, as it permits more time for detailed evaluation of strength.

1817 Which of the following diseases can cause false-positive Edrophonium anticholinesterase test ?

Harrison's 18th Ed. 3481

- A. Amyotrophic lateral sclerosis
- B. Hodgkin lymphoma
- C. Charcot-Marie-Tooth disease
- D. Creutzfeldt-Jakob disease (CJD)

False-positive Edrophonium anticholinesterase test occur in occasional patients with amyotrophic lateral sclerosis, and in placebo-reactors.

1818 Which of the following component of the neuromuscular junction may be affected in congenital myasthenic syndromes (CMS) ?

Harrison's 18th Ed. 3481

- A. Presynaptic nerve terminal
- B. Various subunits of AChR
- C. Various subunits of AChE
- D. All of the following

Congenital myasthenic syndromes (CMS) are disorders of neuromuscular junction that are not autoimmune but are due to genetic mutations in which virtually any component of the neuromuscular junction may be affected. Alterations in function of presynaptic nerve terminal or in various subunits of the AChR or AChE have been identified in different forms of CMS.

1819 Which of the following statements about congenital myasthenic syndromes (CMS) is false ?

Harrison's 18th Ed. 3481

- A. Due to genetic mutations
- B. Symptoms begin in infancy or childhood
- C. AChR antibody tests are consistently negative
- D. α subunit of AChR is affected in ~75% of cases

CMS should be suspected when symptoms of myasthenia begin in infancy or childhood & AChR antibody tests are consistently negative. CMS that involve AChR, ϵ subunit is affected in ~75%.

1820 Drugs that can exacerbate weakness in myasthenic patients are all except ?

Harrison's 18th Ed. 3486 Table 386-4

- A. Penicillamine
- B. Aminoglycoside antibiotics
- C. Procainamide
- D. Diazepam

Drugs that may exacerbate MG include aminoglycosides (streptomycin, tobramycin, kanamycin), Quinolones (ciprofloxacin, levofloxacin, ofloxacin, gatifloxacin), macrolides (erythromycin, azithromycin), Nondepolarizing muscle relaxants (D-Tubocurarine, pancuronium, vecuronium, atracurium), Beta-blockers (Propranolol, atenolol, metoprolol), Local anesthetics (Procaine, Xylocaine), Procainamide, Botulinum toxin, Quinine derivatives (Quinine, quinidine, chloroquine, mefloquine), Magnesium, Penicillamine.

1821 Myasthenia gravis may be "induced" by ?

Harrison's 18th Ed. Table 387-11

- A. Penicillamine
- B. Aminoglycoside antibiotics
- C. Procainamide
- D. Diazepam

1822 Disorders associated with myasthenia gravis include ?

Harrison's 18th Ed. 3483 Table 386-3

- A. Hashimoto's thyroiditis
- B. Graves' disease
- C. Systemic lupus erythematosus
- D. All of the above

Disorders associated with Myasthenia Gravis are thymoma, thymus hyperplasia, Hashimoto's thyroiditis, Graves' disease, rheumatoid arthritis, lupus erythematosus, skin disorders, family history of autoimmune disorder. Hyperthyroidism or hypothyroidism, occult infection, medical treatment for other conditions may exacerbate myasthenia gravis. Tuberculosis, diabetes, peptic ulcer, gastrointestinal bleeding, renal disease, hypertension, asthma, osteoporosis, obesity are disorders that may interfere with therapy.

1823 Which of the following is false about Lambert-Eaton myasthenic syndrome (LEMS) ?

Harrison's 18th Ed. 3482

- A. Presynaptic disorder of neuromuscular junction
- B. Proximal muscles of lower limbs most commonly affected
- C. Normal deep tendon reflexes
- D. Incremental responses on repetitive nerve stimulation

LEMS is a presynaptic disorder of NM junction. Proximal muscles of lower limbs are most commonly affected. Ptosis & diplopia occur in ~70% of patients. Patients with LEMS have depressed or absent reflexes, experience autonomic changes such as dry mouth and impotence, and have incremental responses on repetitive nerve stimulation.

1824 Which of the following is false about Lambert-Eaton myasthenic syndrome (LEMS) ?

Harrison's 18th Ed. 3482

- A. Autoantibodies against P/Q type calcium channels
- B. Associated small-cell carcinoma of lung
- C. Plasmapheresis ineffective
- D. 3,4 Diaminopyridine (3,4-DAP) helpful

LEMS is caused by autoantibodies directed against P/Q type calcium channels at the motor nerve terminals impairing release of ACh & are detected in ~85% of LEMS patients. Small cell lung carcinoma is common in LEMS. Treatment of LEMS involves plasmapheresis & immunosuppression, 3,4-Diaminopyridine (3,4-DAP) & pyridostigmine.

1825 Muscle testing reveals "jerky release" or "give-away weakness" in which of the following ?

Harrison's 18th Ed. 3482

- A. Lambert-Eaton myasthenic syndrome (LEMS)

- B. Botulism
- C. Hyperthyroidism
- D. Neurasthenia

Muscle testing reveals "jerky release" or "give-away weakness" characteristic of nonorganic disorders like Neurasthenia - a myasthenia-like fatigue syndrome without an organic basis.

1826 Which of the following cause weakness of somatic musculature due to presynaptic neuromuscular junction abnormality ?

Harrison's 18th Ed. 3482

- A. Lambert-Eaton myasthenic syndrome (LEMS)
- B. Botulism
- C. Congenital myasthenic syndromes (CMS)
- D. All of the above

CMS are not due to autoimmune but due to genetic mutations presynaptic nerve terminal or in subunits of AChR or AChE. In Botulism, bacterial toxin interferes with release of acetylcholine from presynaptic nerve terminal.

1827 Muscarinic side effects of anticholinesterase medication include all except ?

Harrison's 18th Ed. 3483

- A. Diarrhea
- B. Abdominal cramps
- C. Dry mouth
- D. Nausea

Muscarinic side effects of anticholinesterase medication are diarrhea, abdominal cramps, salivation and nausea.

1828 Thymoma is suspected if thymus is enlarged after ?

Harrison's 18th Ed. 3483

- A. > 10 years
- B. > 20 years
- C. > 30 years
- D. > 40 years

Thymic shadow on CT is normal in young adulthood, but thymus enlargement in a patient >40 years is highly suspicious of thymoma.

1829 By consensus, thymectomy should be done in all patients with generalized MG between ?

Harrison's 18th Ed. 3484

- A. Puberty and 55 years
- B. 30 and 55 years
- C. 40 and 65 years
- D. 50 and 75 years

It is the consensus that thymectomy should be carried out in all patients with generalized MG who are between puberty and at least 55 years of age.

1830 If immediate improvement is essential, which of the following is used to manage MG ?

Harrison's 18th Ed. 3484

- A. Thymectomy
- B. High-dose cyclophosphamide
- C. Glucocorticoids
- D. Intravenous immunoglobulin (IVIg)

In MG, if immediate improvement is essential, IVIg is given or plasmapheresis instituted.

1831 Which of the following produce clinical improvement within a period of 1 - 3 months ?

Harrison's 18th Ed. 3484

- A. Glucocorticoids
- B. Cyclosporine
- C. Tacrolimus
- D. All of the above

For the intermediate term goal of improvement, glucocorticoids, cyclosporine or tacrolimus produce clinical improvement within a period of 1- 3 months.

1832 Which of the following immunosuppressive agents is preferred (toxicity & cost) in treatment of MG ?

Harrison's 18th Ed. 3484

- A. Azathioprine
- B. Cyclosporine
- C. Mycophenolate mofetil
- D. Cyclophosphamide

1833 Beneficial effect of azathioprine takes how long to appear ?

Harrison's 18th Ed. 3484

- A. 7 - 21 days
- B. 1 - 3 months
- C. 3 to 6 months
- D. 18 months

Beneficial effects of azathioprine & mycophenolate mofetil begin after many months (up to a year).

1834 Which of the following is used in MG patients refractory to optimal treatment with immunosuppressive agents ?

Harrison's 18th Ed. 3484

- A. Tacrolimus
- B. High-dose cyclophosphamide
- C. Mycophenolate mofetil
- D. Intravenous immunoglobulin (IVIg)

Patient with MG refractory to optimal treatment with conventional immunosuppressive agents, high-dose cyclophosphamide may induce long-lasting benefit by "rebooting" the immune system.

1835 Drug of choice for long-term treatment of myasthenic patients is ?

Harrison's 18th Ed. 3484

- A. Azathioprine
- B. Mycophenolate mofetil
- C. Cyclosporine
- D. Tacrolimus

1836 In patients taking azathioprine, which out of the following drugs should not be used ?

Harrison's 18th Ed. 3485

- A. Paracetamol
- B. Allopurinol
- C. Cephalosporins
- D. Terfenadine

In patients taking azathioprine, allopurinol should never be used to treat hyperuricemia, because due to a common degradation pathway, severe bone marrow depression may occur.

1837 Which of the following may be used as indications of adequacy of azathioprine dosage ?

Harrison's 18th Ed. 3484

- A. Increase in hemoglobin

- B. Decrease in ESR
- C. Increase in hematocrit
- D. Increase of RBC mean corpuscular volume

Reduction of lymphocytes to <1000/ μ L and/or an increase of MCV may be used as indications of adequacy of azathioprine dosage.

1838 Which of the following drug is useful in the treatment of anti-MuSK antibody positive MG ?

Harrison's 18th Ed. 3485

- A. Tacrolimus
- B. Rituximab
- C. Cyclophosphamide
- D. Azathioprine

Rituximab, a monoclonal antibody that depletes CD20 B cells, is useful in the treatment of anti-MuSK antibody positive MG.

1839 Most common cause of myasthenic crisis is ?

Harrison's 18th Ed. 3485

- A. Hyperthyroidism
- B. Hypothyroidism
- C. Intercurrent infection
- D. Drug underdose

The most common cause of myasthenic crisis is intercurrent infection.

1840 Which of the following is useful to assess MG patient's clinical status ?

Harrison's 18th Ed. 3485

- A. Forward arm abduction time (5 min)
- B. Forced vital capacity
- C. Time to development of ptosis on upward gaze
- D. All of the above

Most useful clinical tests to assess MG patient's clinical status include forward arm abduction time (up to a full 5 min.), forced vital capacity, range of eye movements, and time to development of ptosis on upward gaze. Patient's AChR antibody level also provides clinically valuable confirmation of the effectiveness of treatment.

387 - Muscular Dystrophies

1841 Clinical findings of a myopathy include all except ?

Harrison's 18th Ed. 3487

- A. Proximal limb weakness
- B. Symmetric limb weakness
- C. Depressed reflexes
- D. Preserved sensation

Clinical findings of a myopathy are proximal, symmetric limb weakness (arms or legs) with preserved reflexes and sensation.

1842 Which of the following is not a cause of intermittent weakness of muscles ?

Harrison's 18th Ed. 3487

- A. Myasthenia gravis
- B. Polymyositis
- C. Paramyotonia congenita
- D. Carnitine palmitoyltransferase deficiency

Disorders causing intermittent muscle weakness include myasthenia gravis, periodic paralyses (hypokalemic, hyperkalemic, and paramyotonia congenita), and metabolic energy deficiencies of glycolysis (myophosphorylase deficiency), fatty acid utilization (carnitine palmitoyltransferase deficiency), and some mitochondrial myopathies.

1843 Which of the following is accompanied by myoglobinuria ?

Harrison's 18th Ed. 3487

- A. Myasthenia gravis
- B. Polymyositis
- C. Paramyotonia congenita
- D. Carnitine palmitoyltransferase deficiency

The states of metabolic energy deficiencies of glycolysis (myophosphorylase deficiency), fatty acid utilization (carnitine palmitoyltransferase deficiency), cause activity-related muscle breakdown accompanied by myoglobinuria, appearing as light-brown- to dark-brown-colored urine.

1844 Which of the following can have a presentation of “dropped head syndrome” ?

Harrison's 18th Ed. 3487

- A. Myasthenia gravis
- B. Amyotrophic lateral sclerosis
- C. Hyperparathyroidism
- D. All of the above

Dropped head syndrome indicates selective neck extensor muscle weakness. Neuromuscular diseases associated with this pattern of weakness include myasthenia gravis, amyotrophic lateral sclerosis, late-onset nemaline myopathy, hyperparathyroidism, focal myositis, and some forms of inclusion body myopathy.

1845 Pathologic fatigability occurs in which of the following ?

Harrison's 18th Ed. 3487

- A. Disorders of neuromuscular transmission
- B. Disorders of defects in glycolysis
- C. Chronic myopathies
- D. All of the above

Pathologic fatigability refers to inability to maintain or sustain a force. It occurs in disorders of neuromuscular transmission and in disorders altering energy production (glycolysis, lipid metabolism, or mitochondrial energy production), chronic myopathies.

1846 Drugs that cause true myalgia include ?

Harrison's 18th Ed. 3490 Table 387-3

- A. Cimetidine
- B. Labetalol
- C. Statins
- D. All of the above

Drugs that cause true myalgia include Cimetidine, Cocaine, Cyclosporine, Danazol, Emetine, Gold, Heroin, Labetalol, Methadone, d-Penicillamine, Statins, L-Tryptophan, Zidovudine.

1847 Which of the following is a painful muscle condition ?

Harrison's 18th Ed. 3489

- A. Paramyotonia congenita
- B. Amyotrophic lateral sclerosis
- C. Fibromyalgia
- D. All of the above

Painful muscle conditions not associated with muscle weakness include fibromyalgia and polymyalgia rheumatica.

1848 Which of the following is associated with polymyalgia rheumatica ?

Harrison's 18th Ed. 3489

- A. Takayasu's arteritis

- B. Henoch-Schönlein purpura
- C. Temporal arteritis
- D. Granulomatosis with polyangiitis (Wegener's)

Giant cell arteritis, also referred to as cranial arteritis or temporal arteritis, is an inflammatory disorder of medium- and large-sized arteries, may accompany polymyalgia rheumatica.

1849 Muscle cramps often occur in which of the following neurogenic disorders ?

Harrison's 18th Ed. 3489

- A. Motor neuron disease
- B. Radiculopathies
- C. Polyneuropathies
- D. All of the above

Muscle cramps often occur in neurogenic disorders, especially motor neuron disease, radiculopathies, and polyneuropathies. They are not a feature of most primary muscle diseases.

1850 Which of the following enzymes is not found in muscles ?

Harrison's 18th Ed. 3490

- A. Creatine kinase (CK)
- B. Aldolase
- C. Lactic dehydrogenase (LDH)
- D. Gamma-glutamyl transferase (GGT)

Creatine kinase (CK), aspartate aminotransferase (AST), alanine aminotransferase (ALT), aldolase, and lactic dehydrogenase (LDH) are enzymes sharing an origin in both muscle and liver. Gamma-glutamyl transferase (GGT) has a liver origin and is not found in muscle.

1851 Nationality of Guillaume Benjamin Amand Duchenne de Boulogne was ?

- A. Polish
- B. French
- C. German
- D. Danish

1852 Who discovered dystrophin gene ?

- A. Little
- B. Gowers
- C. Kunkel
- D. Meryon

1853 Duchenne Muscular dystrophy is present at ?

Harrison's 18th Ed. 3491

- A. Birth
- B. 1 - 2 years
- C. 3 - 5 years
- D. 5 - 7 years

Duchenne dystrophy is present at birth, but it usually becomes apparent between ages 3 & 5.

1854 'Gowers' maneuver' is diagnostic of ?

Harrison's 18th Ed. 3494

- A. Duchenne Muscular Dystrophy (DMD)
- B. Limb-girdle Muscular Dystrophy
- C. Emery-Dreifuss Muscular Dystrophy
- D. Facioscapulohumeral Muscular Dystrophy

1855 Patients with Duchenne dystrophy are typically in a wheelchair by the age of ?

Harrison's 18th Ed. 3494

- A. 8
- B. 10
- C. 12
- D. 14

Patients with Duchenne dystrophy are typically in wheelchair by age of 12.

1856 Gowers' sign is due to weakness of which group of muscles ?

Harrison's 18th Ed. 3494 Table 387-2

- A. Knee extensor muscles
- B. Hip muscles
- C. Anterior compartment of leg muscles
- D. Posterior compartment of leg muscles

Gowers' sign refers to the inability to get up from the floor without climbing up the extremities. Weakness is in the hip, thigh, and trunk muscles.

1857 In DMD, which of the following muscle groups are preferentially involved ?

Harrison's 18th Ed. 3494

- A. Distal limb muscles
- B. Neck flexors
- C. Neck extensors
- D. Anterior abdominal muscles

Loss of muscle strength is progressive, with predilection for proximal limb muscles and neck flexors.

1858 Which of the following about DMD is false ?

Harrison's 18th Ed. 3494

- A. Due to mutation in dystrophin gene
- B. Dystrophin is the largest identified human gene
- C. Dystrophin is on X chromosome
- D. Mostly due to gene duplication

DMD is caused by a mutation of gene encoding 427-kDa dystrophin protein on the inner surface of sarcolemma. Dystrophin gene is one of the largest identified human genes (>2000 kb) on the short arm of X chromosome (Xp21). Most common gene mutation is a deletion. Less often, Duchenne's dystrophy is caused by a gene duplication or point mutation.

1859 Which of the following is an uncommon cause of death in Duchenne's muscular dystrophy ?

Harrison's 18th Ed. 3494

- A. Pulmonary infection
- B. Aspiration of food
- C. Acute gastric dilation
- D. Cardiac cause (cardiomyopathy)

By age 16–18 years, patients of DMD are predisposed to serious, sometimes fatal pulmonary infections. Other causes of death include aspiration of food and acute gastric dilation. Cardiac cause of death is uncommon despite the presence of a cardiomyopathy in almost all patients.

1860 Which of the following statements about serum CK levels in DMD is false ?

Harrison's 18th Ed. 3494

- A. Invariably elevated
- B. Serum CK levels are abnormal at birth
- C. Decline late in the disease

- D. None of the above

In DMD, serum CK levels are invariably elevated (20 to 100 times). Levels are abnormal at birth but decline late in the disease because of inactivity & loss of muscle mass.

1861 Dystrophin binds to which of the following in sarcolemma ?

Harrison's 18th Ed. 3494

- A. Laminin
- B. Alpha-dystroglycan
- C. F-actin
- D. Caveolin-3

Dystrophin is part of a large complex of sarcolemmal proteins and glycoproteins. Dystrophin binds to F-actin at its amino terminus and to beta-dystroglycan at the carboxyl terminus.

1862 In essence, the key defect in DMD due to abnormal dystrophin protein is ?

Harrison's 18th Ed. 3494

- A. Physical weakening of the sarcolemma
- B. Disruption of Golgi apparatus
- C. Abnormal mitochondria
- D. Abnormal extracellular matrix (ECM)

Dystrophin-glycoprotein complex confer stability to the sarcolemma. Disruption of dystrophin-glycoprotein complexes weakens sarcolemma, causing membrane tears and a cascade of events leading to muscle fiber necrosis and eventually muscular dystrophy.

1863 Which of the following significantly slows progression of Duchenne's dystrophy ?

Harrison's 18th Ed. 3495

- A. Azathioprine
- B. Glucocorticoids
- C. Cyclosporine
- D. IVIg

Glucocorticoids (prednisone 0.75 mg/kg per day), significantly slows progression of Duchenne's dystrophy for up to 3 years.

1864 Becker's Muscular Dystrophy resembles which of the following muscular dystrophy ?

Harrison's 18th Ed. 3495

- A. Duchenne's muscular dystrophy
- B. Limb-Girdle Muscular Dystrophy
- C. Emery-Dreifuss Muscular Dystrophy
- D. Myotonic Dystrophy

Becker's muscular dystrophy is a less severe and 10 times less frequent form of X-linked recessive Duchenne's muscular dystrophy.

1865 Most patients with Becker's muscular dystrophy first experience difficulties at what age ?

Harrison's 18th Ed. 3491

- A. Birth
- B. 1 - 2 years
- C. 3 - 5 years
- D. 5 - 15 years

Most patients with Becker's dystrophy first experience difficulties between ages 5 and 15 years.

1866 Calpains are Ca⁺⁺ dependent ?

N Engl J Med 2005;352:2413-23

- A. Cysteine proteases
- B. Arginine proteases

- C. Methionine proteases
- D. Leucine proteases

1867 Tissue-specific calpains have been implicated in ?

N Engl J Med 2005;352:2413-23

- A. Diabetes
- B. Multiple sclerosis
- C. Limb-girdle muscular dystrophy type 2A (LGMD2A)
- D. All of the above

1868 Which of the following statements about Calpain is false ?

N Engl J Med 2005;352:2413-23

- A. Calpain activity is regulated by calpastatin
- B. Calpains are involved in apoptosis
- C. Calpain is a cytoplasmic protease
- D. None of the above

1869 LGMD2A is caused by gene mutations in ?

Harrison's 18th Ed. 3493 Table 387-7

- A. Calpain-1
- B. Calpain-2
- C. Calpain-3
- D. Calpain-4

1870 LGMD2B is due to defect in ?

Harrison's 18th Ed. 3493 Table 387-7

- A. Dysferlin
- B. Emerin
- C. Telethonin
- D. Titin

1871 Which of the following is a variant of LGMD2B ?

Harrison's 18th Ed. 3493 Table 387-7

- A. Welander distal myopathy
- B. Tibial muscular dystrophy (Udd)
- C. Laing distal myopathy
- D. Miyoshi myopathy

Miyoshi's myopathy is variant of LGMD2B with calf muscles affected at onset

1872 In which of the following gastrocnemius muscles are preferentially affected at onset ?

Harrison's 18th Ed. 3499

- A. Welander distal myopathy
- B. Tibial muscular dystrophy (Udd)
- C. Laing distal myopathy
- D. Miyoshi myopathy

In dysferlinopathies (LGMD2B) there is a predilection for early atrophy of gastrocnemius muscles. Miyoshi myopathy is unique in that gastrocnemius muscles are preferentially affected at onset.

1873 Which of the following muscular dystrophy has its onset at birth ?

Harrison's 18th Ed. 3497 Table 387-8

- A. Muscle-eye-brain disease
- B. Walker-Warburg syndrome
- C. Myotubular myopathy

D. All of the above

Merosin deficiency, Fukitin-related protein deficiency, Fukuyama congenital muscular dystrophy, Muscle-eye-brain disease, Walker-Warburg syndrome are congenital muscular dystrophies that have an onset at birth. Clinically, Walker-Warburg syndrome is more severe, with death by 1 year.

1874 Which of the following muscles is relatively spared in Facioscapulohumeral (FSH) muscular dystrophy ?

Harrison's 18th Ed. 3498

- A. Facial
- B. Biceps
- C. Triceps
- D. Deltoid

Facial weakness is the initial manifestation in Facioscapulohumeral (FSH) Muscular Dystrophy. Weakness of shoulder girdles brings patient to the doctor. Scapular winging is common. Biceps, triceps, wrist extensors & muscles weakness of anterior compartment muscles of legs are severely affected, with relative sparing of deltoid muscles.

1875 Which of the following distal myopathy begins in hands ?

Harrison's 18th Ed. 3500 Table 387-9

- A. Welander distal myopathy
- B. Tibial muscular dystrophy
- C. Nonanka distal myopathy
- D. Miyoshi myopathy

In autosomal dominant Welander's distal myopathy, onset is in 5th decade, weakness begins in hands and slowly progresses to involve distal lower extremities. Lifespan is normal.

1876 Which of the following distal myopathies begin in lower limbs ?

Harrison's 18th Ed. 3500 Table 387-9

- A. Tibial muscular dystrophy
- B. Nonanka distal myopathy
- C. Miyoshi myopathy
- D. All of the above

1877 Serum CK is elevated most in which of the following distal myopathies ?

Harrison's 18th Ed. 3499

- A. Welander distal myopathy
- B. Tibial muscular dystrophy
- C. Nonanka distal myopathy
- D. Miyoshi myopathy

Serum CK level is is very elevated in Miyoshi myopathy. In other distal myopathies, serum CK is only slightly increased.

1878 Which of the following is not a congenital myopathy ?

Harrison's 18th Ed. 3499

- A. Central core disease
- B. Nemaline (rod) myopathy
- C. Miyoshi myopathy
- D. Centronuclear (myotubular) myopathy

Miyoshi myopathy is a type of distal myopathy. Minicore myopathy (multi-minicore disease), fingerprint body myopathy, and sarcotubular myopathy are also congenital myopathies.

1879 Patients with which of the following congenital myopathies are susceptible to malignant hyperthermia ?

Harrison's 18th Ed. 3499

- A. Central core disease
- B. Nemaline (rod) myopathy

C. Centronuclear (myotubular) myopathy

D. All of the above

Malignant hyperthermia during anesthesia may occur in central core disease. C-terminal mutations of the RYR1 gene (ryanodine receptor gene on chromosome 19q) predispose to this complication.

1880 Severe brain impairment is seen in which of the following congenital muscular dystrophies ?

Harrison's 18th Ed. 3496

- A. Fukuyama congenital muscular dystrophy (FCMD)
- B. Muscle-eye-brain (MEB) disease
- C. Walker-Warburg syndrome (WWS)
- D. All of the above

Congenital muscular dystrophy with severe brain impairment are FCMD, MEB disease & WWS. In MEB & WWS, but not in FCMD, vision is impaired. WWS is the most severe congenital muscular dystrophy.

1881 Which of the following enzyme is not found in muscle ?

Harrison's 18th Ed. 3490

- A. Aspartate aminotransferase (AST)
- B. Alanine aminotransferase (ALT)
- C. Lactic dehydrogenase (LDH)
- D. γ -glutamyl transferase (GGT)

Enzymes AST, ALT, aldolase and LDH originate in both muscle & liver. Origin of GGT is liver and is not found in muscle.

1882 "Hatchet-faced" appearance is typical of which of the following condition ?

Harrison's 18th Ed. 3496

- A. Facioscapulohumeral (FSH) Muscular Dystrophy
- B. Myotonic dystrophy
- C. Emery-Dreifuss Muscular Dystrophy
- D. Limb-Girdle Muscular Dystrophy

Patients with myotonic dystrophy have a typical "hatchet-faced" appearance due to temporalis, masseter and facial muscle atrophy and weakness. Frontal baldness is also a characteristic feature.

1883 Which of the following is an "antimyotonia drug" ?

Harrison's 18th Ed. 3498

- A. Mexiletine
- B. Amiodarone
- C. Flecainide
- D. Sotalol

Phenytoin & mexiletine are the preferred antimyotonia drugs.

1884 Which of the following is a principal source of energy for skeletal muscles ?

Harrison's 18th Ed. 3501

- A. Amono acid
- B. Fatty acid
- C. Lactic acid
- D. All of the above

Fatty acids and glucose are are the two principal sources of energy for skeletal muscles.

1885 Alpha-glucosidase or acid maltase deficiency is also called ?

Harrison's 18th Ed. 3501

- A. Leigh's syndrome
- B. Kearns-Sayre Syndrome (KSS)

- C. Pompe's Disease
- D. McArdle's disease

Alpha-glucosidase or acid maltase deficiency is also called Pompe's Disease.

1886 Which out of the following is the most common alpha-glucosidase, or acid maltase deficiency ?

Harrison's 18th Ed. 3501

- A. Infantile form
- B. Childhood form
- C. Adult form
- D. None of the above

There are three clinical forms of alpha-glucosidase, or acid maltase deficiency (type II glycogenosis). The infantile form is the most common, with onset of symptoms in the first 3 months of life.

1887 Which of the following about Pompe's disease is false ?

Harrison's 18th Ed. 3501

- A. Autosomal recessive disorder
- B. Caused by mutations of the alpha-glucosidase gene
- C. Enzyme replacement tt. beneficial in infantile-onset type
- D. None of the above

Enzyme replacement therapy (ERT) with IV recombinant human alpha-glucosidase is beneficial in infantile-onset type.

1888 Which of the following is a disorder of glycolysis causing exercise intolerance ?

Harrison's 18th Ed. 3502

- A. Myophosphorylase deficiency
- B. Phosphofructokinase deficiency
- C. Lactate dehydrogenase deficiency
- D. All of the above

Disorders of glycolysis causing exercise intolerance include myophosphorylase deficiency (type V glycogenosis), phosphofructokinase deficiency (type VII glycogenosis), phosphoglycerate kinase deficiency (type IX glycogenosis), phosphoglycerate mutase deficiency (type X glycogenosis), lactate dehydrogenase deficiency (glycogenosis type XI), and beta-enolase deficiency. These glycolytic defects are associated with recurrent myoglobinuria.

1889 Which of the following is called McArdle's disease ?

Harrison's 18th Ed. 3502

- A. Myophosphorylase deficiency
- B. Phosphofructokinase deficiency
- C. Lactate dehydrogenase deficiency
- D. Beta-enolase deficiency

Myophosphorylase deficiency is also called McArdle's disease and is the most common of the glycolytic defects associated with exercise intolerance.

1890 Seizure disorder with mental retardation is a feature of which of the following ?

Harrison's 18th Ed. 3502

- A. Myophosphorylase deficiency
- B. Phosphofructokinase deficiency
- C. Phosphoglycerate kinase deficiency
- D. Beta-enolase deficiency

In McArdle's disease, exercise tolerance is enhanced by warm-up or brief periods of rest. Hemolytic anemia accompany deficiencies of phosphofructokinase & phosphoglycerate kinase. Seizure disorder with mental retardation is the usual clinical presentation in phosphoglycerate kinase deficiency.

1891 Which of the following is a X-linked recessive disorder ?

Harrison's 18th Ed. 3502

- A. Myophosphorylase deficiency
- B. Phosphofructokinase deficiency
- C. Phosphoglycerate mutase deficiency
- D. Phosphoglycerate kinase deficiency

Myophosphorylase deficiency, phosphofructokinase deficiency & phosphoglycerate mutase deficiency are inherited as autosomal recessive disorders. Phosphoglycerate kinase deficiency has X-linked recessive inheritance.

1892 Which of the following statements about lipid as energy source is false ?

Harrison's 18th Ed. 3502

- A. Fatty acids are derived from circulating VLDL in blood
- B. Fatty acids are derived from triglycerides in muscle fibers
- C. Oxidation of fatty acids occurs in mitochondria
- D. None of the above

1893 To enter mitochondria, a fatty acid must first be converted to ?

Harrison's 18th Ed. 3502

- A. Enoyl-acyl carrier
- B. Acyl-NADH
- C. Acyl-CoA
- D. Amino-acyl-tRNA

Oxidation of fatty acids occurs in mitochondria. To enter mitochondria, a fatty acid must first be converted to an "activated fatty acid," acyl-CoA.

1894 Acyl-CoA must be linked to which of the following for transport into mitochondria ?

Harrison's 18th Ed. 3502

- A. Acyl-CoA dehydrogenase
- B. Cystinosin
- C. Carnitine
- D. Carnitine palmitoyltransferase (CPT) I

Acyl-CoA must be linked with carnitine by enzyme carnitine palmitoyltransferase (CPT) I for transport into mitochondria.

1895 Enzyme carnitine palmitoyltransferase (CPT) I is present on ?

Harrison's 18th Ed. 3502

- A. Outer side of outer mitochondrial membrane
- B. Inner side of outer mitochondrial membrane
- C. Outer side of inner mitochondrial membrane
- D. Inner side of inner mitochondrial membrane

Carnitine palmitoyltransferase (CPT) I is present on inner side of outer mitochondrial membrane.

1896 Enzyme carnitine palmitoyltransferase (CPT) II is present on ?

Harrison's 18th Ed. 3502

- A. Outer side of outer mitochondrial membrane
- B. Inner side of outer mitochondrial membrane
- C. Outer side of inner mitochondrial membrane
- D. Inner side of inner mitochondrial membrane

Carnitine is removed by CPT II, an enzyme attached to the inside of inner mitochondrial membrane, allowing transport of acyl-CoA into the mitochondrial matrix for beta-oxidation.

1897 Myoglobinuria in CPT II deficiency is precipitated by ?

Harrison's 18th Ed. 3502

- A. Prolonged exercise
- B. Fasting
- C. Infections
- D. All of the above

CPT II deficiency is much more common in men than women (5:1) and is the most common recognizable cause of recurrent myoglobinuria. Muscle pain and myoglobinuria can be precipitated by prolonged exercise, fasting or infections.

1898 Which of the following is false about human mitochondrial DNA (mtDNA) ?

Harrison's 18th Ed. 3502

- A. Double-stranded circular molecule
- B. Codes for transfer & ribosomal RNAs & polypeptides
- C. Directly inherited from cytoplasm of oocyte mainly
- D. None of the above

Each mitochondrion possesses a DNA genome that is distinct from that of nuclear DNA. Human mitochondrial DNA (mtDNA) consists of a double-strand, circular molecule comprising 16,569 base pairs. It codes for 22 transfer RNAs, 2 ribosomal RNAs, and 13 polypeptides of the respiratory chain enzymes. Genetics of mitochondrial diseases differ from genetics of chromosomal disorders. DNA of mitochondria is directly inherited from the cytoplasm of gametes, mainly oocyte. Sperm contributes very little. Thus, mitochondrial genes are derived almost exclusively from mother.

1899 Which of the following is a mitochondrial myopathy ?

Harrison's 18th Ed. 3503

- A. Chronic progressive external ophthalmoplegia (CPEO)
- B. Skeletal muscle - CNS syndromes
- C. Pure myopathy
- D. All of the above

Mitochondrial myopathies include chronic progressive external ophthalmoplegia (CPEO), skeletal muscle - CNS syndromes & pure myopathy.

1900 Which of the following about Kearns-Sayre Syndrome (KSS) is false ?

Harrison's 18th Ed. 3503

- A. Onset before 20 years of age
- B. CPEO
- C. Pigmentary retinopathy
- D. Diplopia

In CPEO, varying degrees of ptosis & weakness of extraocular muscles are seen, usually in the absence of diplopia, a point of distinction from myasthenia gravis. Triad of clinical findings in KSS includes onset before age 20, CPEO, and pigmentary retinopathy, plus one or more of the following features: complete heart block, cerebrospinal fluid protein >100 mg/dL, or cerebellar ataxia.

1901 Which of the following is a cardinal sign of mitochondrial disorders ?

Harrison's 18th Ed. 3503

- A. Diabetes mellitus
- B. Addison's disease
- C. Hypoparathyroidism
- D. Hyperaldosteronism

Diabetes mellitus is a cardinal sign of mitochondrial disorders and occurs in 13% of KSS patients.

1902 Which of the following about KSS is false ?

Harrison's 18th Ed. 3503

- A. Sporadic disorder
- B. Caused by single mtDNA deletions
- C. Spontaneous deletion occur in ovum or zygote

- D. Spontaneous deletion occur in spermatozoa

KSS is a sporadic disorder. The disease is caused by single mtDNA deletions arising spontaneously in the ovum or zygote. The most common deletion removes 4,977 bp of contiguous mtDNA.

1903 Which of the following is false about progressive external ophthalmoplegia (PEO) ?

Harrison's 18th Ed. 3503

- A. Due to mtDNA mutations
- B. Inherited in a Mendelian fashion
- C. Onset is usually after puberty
- D. Ragged red fibers seen in muscle biopsy

PEO is caused by nuclear DNA mutations affecting mtDNA copy number & integrity. It is inherited in a Mendelian fashion. Onset is usually after puberty. CSF protein is normal. Ragged red fibers are prominently seen in muscle biopsy.

1904 Which of the following chromosome is affected in autosomal dominant form of CPEO ?

Harrison's 18th Ed. 3503

- A. 4q35
- B. 10q24
- C. 15q22-26
- D. All of the above

Autosomal dominant form of CPEO is linked to loci on 3 chromosomes - 4q35, 10q24 & 15q22-26.

1905 "Twinkle" is the gene product of ?

Harrison's 18th Ed. 3503

- A. 4q35
- B. 10q24
- C. 15q22-26
- D. All of the above

In chromosome 10q-related CPEO, mutations occur in C10orf2 gene. Its gene product is *twinkle*, named for its punctate, starlike staining properties. It co-localizes with mtDNA and is critical for lifetime maintenance of mitochondrial integrity.

1906 Enzyme important in mtDNA replication is ?

Harrison's 18th Ed. 3503

- A. Carnitine palmitoyltransferase (CPT) I
- B. Acid maltase
- C. Myoadenylate deaminase
- D. POLG

In CPEO mapped to chromosome 15q, a mutation affects the gene encoding mtDNA polymerase (POLG), an enzyme important in mtDNA replication.

1907 Characteristic feature of myoclonic epilepsy with ragged red fibers (MERRF) is ?

Harrison's 18th Ed. 3503

- A. Myoclonic epilepsy
- B. Cerebellar ataxia
- C. Progressive muscle weakness
- D. All of the above

Characteristic features include myoclonic epilepsy, cerebellar ataxia, and progressive muscle weakness in a limb-girdle distribution. Other more variable features include dementia, peripheral neuropathy, optic atrophy, hearing loss, and diabetes mellitus.

1908 To be called ragged red fiber, which of the following is abnormal in a muscle cell ?

Harrison's 18th Ed. 3502

- A. Golgi apparatus
- B. Mitochondria
- C. Cell membrane
- D. Nucleus

Term ragged red fibers was coined by Olson (1972) to describe muscle fibers with significant numbers of abnormal mitochondria (enlarged, bizarrely shaped with crystalline inclusions) highlighted with modified trichrome stain.

1909 Which of the following is caused by maternally inherited point mutations of mitochondrial tRNA gene ?

Harrison's 18th Ed. 3503

- A. Kearns-Sayre Syndrome (KSS)
- B. MERRF
- C. Pompe's Disease
- D. All of the above

MERRF & MELAS are caused by maternally inherited point mutations of mitochondrial tRNA genes.

1910 Which of the following about Mitochondrial Myopathy, Encephalopathy, Lactic Acidosis, and Stroke like Episodes (MELAS) is false ?

Harrison's 18th Ed. 3503

- A. Cerebral lesions conform to a vascular distribution
- B. Partial motor or generalized seizures
- C. Serum lactic acid is elevated
- D. Muscle biopsies show ragged red fibers

IN MELAS, the term stroke like is appropriate because cerebral lesions do not conform to a strictly vascular distribution. Like KSS, onset is before age 20. Seizures are partial motor or generalized. Cerebral insults cause hemiparesis, hemianopia, and cortical blindness. Serum lactic acid is typically elevated. CSF protein is increased. Muscle biopsies show ragged red fibers.

1911 Which of the following about Mitochondrial Myopathy, Encephalopathy, Lactic Acidosis, and Stroke like Episodes (MELAS) is false ?

Harrison's 18th Ed. 3504

- A. Focal lesions in frontal lobes
- B. Basal ganglia calcification
- C. Vascular territories are not respected
- D. Cerebral angiography essentially normal

IN MELAS, neuroimaging shows basal ganglia calcification. Focal lesions mimicking infarction are seen mainly in occipital & parietal lobes. Strict vascular territories are not respected, and cerebral angiography does not show lesions of the major cerebral blood vessels.

1912 Which of the following is caused by maternally inherited point mutations of mitochondrial tRNA gene ?

Harrison's 18th Ed. 3504

- A. Kearns-Sayre Syndrome (KSS)
- B. MELAS
- C. Pompe's Disease
- D. Mitochondrial DNA depletion syndrome (MDS)

MERRF & MELAS are caused by maternally inherited point mutations of mitochondrial tRNA genes.

1913 Which of the following point mutation is most common in MELAS ?

Harrison's 18th Ed. 3504

- A. A3243G point mutation in tRNA^{Leu(UUR)}
- B. 3252G point mutation in tRNA^{Leu(UUR)}

- C. 3256T point mutation in tRNA^{Leu(UUR)}
- D. 3271C point mutation in tRNA^{Leu(UUR)}

In MELAS, A3243G point mutation in tRNA^{Leu(UUR)} is the most common (80%).

1914 Which of the following is a calcium channelopathy ?

Harrison's 18th Ed. 3504 Table 387-10

- A. Hypokalemic periodic paralysis
- B. Hyperkalemic periodic paralysis
- C. Paramyotonia congenita
- D. Andersen-Tawil Syndrome

1915 Which of the following is a potassium channelopathy ?

Harrison's 18th Ed. 3504 Table 387-10

- A. Hypokalemic periodic paralysis
- B. Hyperkalemic periodic paralysis
- C. Paramyotonia congenita
- D. Andersen-Tawil Syndrome

1916 Hypokalemic periodic paralysis type 1 is caused by mutation in which of the following gene ?

Harrison's 18th Ed. 3504

- A. CALCL1A1
- B. CALCL1A2
- C. CALCL1A3
- D. CALCL1A4

HypoKPP type 1 is inherited as an autosomal dominant disorder with incomplete penetrance. It is due to mutations in voltage-sensitive, skeletal muscle calcium channel gene, CALCL1A3. HypoKPP type 2 is due to mutations in voltage-sensitive sodium channel gene (SCN4A). The muscle cell depolarizes when potassium levels are low.

1917 Onset of hypokalemic periodic paralysis (HypoKPP) is at ?

Harrison's 18th Ed. 3504

- A. Childhood
- B. Adolescence
- C. Adulthood
- D. Middle age

Onset of hypokalemic periodic paralysis (Hypokpp) occurs at adolescence. Episodic weakness with onset after age 25 is almost never due to periodic paralyses.

1918 In hypokalemic periodic paralysis, preferred vehicle for administration of IV potassium is ?

Harrison's 18th Ed. 3505

- A. Normal saline
- B. GDW
- C. Ringer lactate
- D. Mannitol

Treatment of hypokalemic periodic paralysis is oral KCl (0.2 - 0.4 mmol/kg), every 30 minutes. Should IV therapy become necessary (swallowing problems or vomiting), Mannitol is the preferred vehicle for administration of IV potassium as glucose solution may further reduce serum potassium levels.

1919 Hyperkalemic periodic paralysis (HyperKPP) is caused by mutation in which of the following gene ?

Harrison's 18th Ed. 3505

- A. SCN1A
- B. SCN2A
- C. SCN3A

D. SCN4A

HyperKPP is an autosomal dominant disorder due to mutations of voltage-gated sodium channel SCN4A gene.

1920 Attacks of muscle weakness are induced by cold in which of the following ?

Harrison's 18th Ed. 3506

- A. Thomsen's disease
- B. Becker's disease
- C. Paramyotonia congenita
- D. All of the above

In paramyotonia congenita (PC), the attacks of weakness are cold-induced or occur spontaneously. Myotonia in chloride channel disorders - Thomsen's disease and Becker's disease is worsened by cold and improved by activity.

1921 Long QT syndrome is a feature of which of the following ?

Harrison's 18th Ed. 3506

- A. Thomsen's disease
- B. Becker's disease
- C. Paramyotonia congenita
- D. Andersen-Tawil Syndrome

Autosomal dominant Andersen-Tawil Syndrome is a potassium channel disorder characterized by episodic weakness, cardiac arrhythmias (long QT, ventricular ectopy, bidirectional ventricular arrhythmias), and dysmorphic features (short stature, scoliosis, clinodactyly, hypertelorism, small or prominent low-set ears, micrognathia, and broad forehead). It is caused by mutations of the inwardly rectifying potassium channel (Kir 2.1) gene that heighten muscle cell excitability.

1922 Serum CK level is most conspicuously elevated in which of the following endocrine myopathies ?

Harrison's 18th Ed. 3506

- A. Hyperthyroidism
- B. Hypothyroidism
- C. Hyperparathyroidism
- D. Diabetes mellitus

In hypothyroidism, serum CK level is elevated (up to 10 times normal), even when there is minimal clinical evidence of muscle disease. EMG is typically normal.

1923 Characteristic prolongation of relaxation phase of muscle stretch reflexes in hypothyroidism is best observed in ?

Harrison's 18th Ed. 3506

- A. Triceps reflex
- B. Biceps reflex
- C. Supinator reflex
- D. Knee reflex

Relaxation phase of muscle stretch reflexes is characteristically prolonged in hypothyroidism and is best observed at the ankle or biceps brachii reflexes.

1924 Which class of the following lipid-lowering agents causes myopathy ?

Harrison's 18th Ed. 3507

- A. Fibrates
- B. HMG-CoA reductase inhibitors (statins)
- C. Niacin (nicotinic acid)
- D. All of the above

All classes of lipid-lowering agents have been implicated in muscle toxicity, including fibrates (clofibrate, gemfibrozil), HMG-CoA reductase inhibitors (statins), niacin (nicotinic acid) & ezetimibe.

1925 "Acute quadriplegic" myopathy best relates to ?

Harrison's 18th Ed. 3507

- A. Glucocorticoid related myopathy
- B. Lipid-lowering agent related myopathy
- C. Vitamin D related myopathy
- D. Vitamin E related myopathy

Glucocorticoid myopathy occurs with chronic treatment or as "acute quadriplegic" myopathy secondary to high-dose IV glucocorticoid use. Acute quadriplegic myopathy can also occur in sepsis.

1926 Which of the following glucocorticoid pose a high risk for myopathy ?

Harrison's 18th Ed. 3508

- A. Triamcinolone
- B. Betamethasone
- C. Dexamethasone
- D. All of the above

Fluorinated glucocorticoids like triamcinolone, betamethasone and dexamethasone pose a high risk for myopathy.

1927 Which of the following medication can cause mitochondrial myopathy with ragged red fibers ?

Harrison's 18th Ed. 3508

- A. Zidovudine
- B. D-penicillamine
- C. Glucocorticoids
- D. Vitamin D

Zidovudine myopathy produces muscle atrophy affecting thigh & calf muscles. Muscle biopsy shows ragged red fibers with minimal inflammation.

1928 Drug-related inflammatory or antibody-mediated myopathy is caused by which of the following medications ?

Harrison's 18th Ed. 3508

- A. Zidovudine
- B. D-penicillamine
- C. Glucocorticoids
- D. Vitamin D

Drug-related inflammatory or antibody-mediated myopathy is most consistently caused by D-penicillamine. Myasthenia gravis and polymyositis can also occur with D-penicillamine.

388 - Polymyositis, Dermatomyositis, and Inclusion Body Myositis

1929 Which of the following is an inflammatory myopathy ?

Harrison's 18th Ed. 3509

- A. Polymyositis (PM)
- B. Dermatomyositis (DM)
- C. Inclusion body myositis (IBM)
- D. All of the above

Inflammatory myopathies include polymyositis (PM), dermatomyositis (DM) and inclusion body myositis (IBM).

1930 In inflammatory myopathy, which of the following muscles is not involved ?

Harrison's 18th Ed. 3509

- A. Quadriceps muscle
- B. Ocular muscles
- C. Pharyngeal muscles
- D. Neck-flexor muscles

In inflammatory myopathy, ocular muscles are spared. If these muscles are affected, diagnosis of inflammatory myopathy should be questioned.

1931 Which of the following about inclusion body myositis is false ?

Harrison's 18th Ed. 3509

- A. Thrice more frequent in men than women
- B. May have asymmetric muscle weakness pattern
- C. Fine-motor movements affected late in the course
- D. Falling is common

Fine-motor movements depend on strength of distal muscles are affected late in the course of PM & DM, but fairly early in IBM. Disease progression is slow but steady.

1932 Extramuscular manifestations are associated with which of the following inflammatory myopathies ?

Harrison's 18th Ed. 3510 Table 388-1

- A. Polymyositis
- B. Dermatomyositis
- C. Inclusion Body Myositis
- D. All of the above

1933 Which of the following is present in polymyositis ?

Harrison's 18th Ed. 3510

- A. Skin rash
- B. Involvement of extraocular & facial muscles
- C. Endocrinopathy
- D. None of the above

Polymyositis is a subacute inflammatory myopathy of adults. Following are typically absent - rash, involvement of extraocular & facial muscles, family history of neuromuscular disease, history of exposure to myotoxic drugs or toxins, endocrinopathy, neurogenic disease, muscular dystrophy, biochemical muscle disorder, or IBM.

1934 Which of the following is a feature of dermatomyositis ?

Harrison's 18th Ed. 3510

- A. Gottron rash
- B. V sign
- C. Shawl sign
- D. All of the above

1935 Most common tumors associated with dermatomyositis (DM) include all except ?

Harrison's 18th Ed. 3511

- A. Ovarian cancer
- B. Breast cancer
- C. Colon cancer
- D. Hodgkin lymphoma

In DM, and not in PM or IBM, incidence of ovarian cancer, breast cancer, melanoma, colon cancer, and non-Hodgkin lymphoma is increased.

1936 Which of the following is rare with dermatomyositis (DM) ?

Harrison's 18th Ed. 3511

- A. Rheumatoid arthritis
- B. Systemic lupus erythematosus

- C. Sjögren's syndrome
- D. All of the above

An overlap syndrome occurs in patients with DM who also have manifestations of systemic sclerosis or mixed connective tissue disease. By contrast, signs of rheumatoid arthritis, SLE, or Sjögren's syndrome are very rare in DM.

1937 Patients with overlap syndrome of dermatomyositis and systemic sclerosis have which antinuclear antibody ?

Harrison's 18th Ed. 3511

- A. Anti-PM/Scl
- B. Anti-IBM/Scl
- C. Anti-DM/Scl
- D. All of the above

Patients with overlap syndrome of DM & systemic sclerosis may have anti-PM/Scl antinuclear antibody directed against a nucleolar-protein complex.

1938 Antibody directed against histidyl-transfer RNA synthetase is called ?

Harrison's 18th Ed. 3511

- A. Anti-Jo-1 antibody
- B. Anti-Ro antibody
- C. Anti-Hu antibody
- D. Anti-Zic antibody

Antibody directed against cytoplasmic histidyl-transfer RNA synthetase is called anti-Jo-1. Antibodies to cytoplasmic signal-recognition particles (SRP) are also found in PM.

1939 Inflammatory myopathy patients with anti-Jo-1 antibodies have an increased frequency of ?

Harrison's 18th Ed. 3511

- A. Interstitial lung disease
- B. Raynaud's phenomenon
- C. Nonerosive arthritis
- D. All of the above

Inflammatory myopathy patients with anti-Jo-1 antibodies have an increased frequency of interstitial lung disease, Raynaud's phenomenon, nonerosive arthritis.

1940 Which of the following is characteristic of polymyositis ?

Harrison's 18th Ed. 3511

- A. CD4/MHC-I complex
- B. CD8/MHC-I complex
- C. CD20/MHC-I complex
- D. CD28/MHC-I complex

MHC-I expression is absent from sarcolemma of normal muscle fibers. In PM, cytokines secreted by activated T cells & macrophages induce its expression. THus, in PM & IBM, T cell - mediated cytotoxicity plays a key role, while in DM, humoral immune mechanisms are implicated. CD8/ MHC-I complex is characteristic for histologic diagnosis of PM.

1941 Which of the following parasites can lead to inflammatory myopathy (parasitic polymyositis) ?

Harrison's 18th Ed. 3513

- A. Toxoplasma
- B. Trypanosoma
- C. Cysticerci
- D. All of the above

Protozoa (toxoplasma, trypanosoma), cestodes (cysticerci), and nematodes (trichinae) may produce focal or diffuse inflammatory myopathy known as parasitic polymyositis.

1942 Tropical polymyositis is produced by ?

Harrison's 18th Ed. 3513

- A. Parasite
- B. Bacteria
- C. Virus
- D. Toxin

Staphylococcus aureus, Yersinia, Streptococcus, or anaerobic bacteria may produce a suppurative myositis known as tropical polymyositis or pyomyositis.

1943 Acute painless muscle weakness with myoglobinuria may occur with ?

Harrison's 18th Ed. 3513

- A. Hypokalemia
- B. Hypophosphatemia
- C. Hypomagnesemia
- D. Any of the above

Acute painless muscle weakness with myoglobinuria may occur with prolonged hypokalemia, or hypophosphatemia and hypomagnesemia, usually in chronic alcoholics or in patients on nasogastric suction receiving parenteral hyperalimentation.

1944 D-penicillamine is used in which of the following diseases ?

Harrison's 18th Ed. 3509

- A. Scleroderma
- B. Rheumatoid arthritis
- C. Primary biliary cirrhosis
- D. All of the above

D-penicillamine chelates copper and is used in Wilson's disease. It is also used in scleroderma, rheumatoid arthritis, and primary biliary cirrhosis.

1945 β-amyloid deposits on muscle biopsy are found in ?

Harrison's 18th Ed. 3512 Table 388-2

- A. Polymyositis
- B. Dermatomyositis
- C. Inclusion Body Myositis
- D. All of the above

In IBM, β-amyloid deposits within vacuolated muscle fibers & abnormal mitochondria with cytochrome oxidase - negative fibers are found.

1946 Which of the following drugs produce true myositis resembling PM ?

Harrison's 18th Ed. 3514

- A. Amphotericin B
- B. Colchicine
- C. Procainamide
- D. Simvastatin

D-Penicillamine & procainamide produce a true myositis resembling PM. AZT causes a mitochondrial myopathy. Toxic noninflammatory myopathy is caused by clofibrate, lovastatin, simvastatin, or pravastatin, especially when combined with cyclosporine or gemfibrozil.

1947 In PM & DM, objective increase in muscle strength occurs how many months after prednisone treatment ?

Harrison's 18th Ed. 3517

- A. 1 month
- B. 3 months
- C. 6 months
- D. 12 months

Efficacy of prednisone is noted by objective increase in muscle strength & activities of daily living, which occurs by 3rd month. DM responds better than PM.

1948 Which of the following is ineffective in PM & DM ?

Harrison's 18th Ed. 3517

- A. Azathioprine
- B. Mycophenolate mofetil
- C. Intravenous immunoglobulin (IVIg)
- D. Plasmapheresis

Neither plasmapheresis nor leukapheresis appears to be effective in PM & DM.

390 - Biology of Psychiatric Disorders

1949 Psychiatric disorders are central nervous system diseases characterized by disturbances in ?

Harrison's 18th Ed. 3522

- A. Emotion
- B. Cognition
- C. Socialization
- D. All of the above

Psychiatric disorders are central nervous system diseases characterized by disturbances in emotion, cognition, motivation, and socialization.

1950 DSM-IVTR was released in which year ?

Harrison's 18th Ed. 3522

- A. 2000
- B. 2001
- C. 2002
- D. 2004

Diagnostic and Statistical Manual of Mental Disorders of the American Psychiatric Association, 4th edition, text revision (DSM-IVTR) was released in year 2000.

1951 Asperger's syndrome best relates to ?

Harrison's 18th Ed. 3522

- A. Autism spectrum Disorders (ASD)
- B. Schizophrenia
- C. Mood Disorders
- D. Substance Use Disorders

Individuals with autism-like symptoms (delays or abnormal functioning in social interactions, language as used in social communication, and symbolic or imaginative play, with onset prior to age 3) with relatively preserved cognitive functioning and language skills have Asperger's syndrome.

1952 Alleles of which of the following genes is associated with both ASDs and schizophrenia ?

Harrison's 18th Ed. 3522

- A. MeCP2
- B. Neurexin 1
- C. TSC 1 & 2
- D. FMR1

Mutations in MeCP2, FMR1 and TSC1&2 can cause mental retardation without ASDs, and alleles of neurexin 1 is associated with both ASDs and schizophrenia.

1953 Major symptom cluster seen in schizophrenia is ?

Harrison's 18th Ed. 3523

- A. Positive
- B. Negative
- C. Cognitive
- D. All of the above

Three major symptom clusters seen in schizophrenia are positive (hallucinations & delusions), negative (blunted affect, impoverished speech, asocial behavior, and diminished motivation), and cognitive symptoms (disabling deficits in working memory & cognitive control of behavior).

1954 Current antipsychotic drugs are efficacious for which symptom cluster seen in schizophrenia ?

Harrison’s 18th Ed. 3523

- A. Positive
- B. Negative
- C. Cognitive
- D. All of the above

Positive symptoms cluster seen in schizophrenia responds to current antipsychotic drugs that generally lack efficacy for negative and cognitive symptoms.

1955 The best-established neuropathologic finding in schizophrenia is ?

Harrison’s 18th Ed. 3523

- A. Cerebral hemisphere asymmetry
- B. Reduced number of gyri & sulci
- C. Enlargement of lateral ventricles
- D. Increase in cortical thickness

The best-established neuropathologic finding in schizophrenia is enlargement of the lateral ventricles of the cerebral hemispheres accompanied by a reduction in cortical thickness.

Schizophrenia

1956 Which of the following is related to schizophrenia ?

- A. Split personality
- B. Multiple-personality
- C. ‘Functional’ psychosis
- D. None of the above

1957 Which of the following term was used to address schizophrenia in past ?

- A. Frontotemporal dementia
- B. Dementia with Lewy bodies
- C. Dementia praecox
- D. Conversion reaction

1958 Out of the following, who performed original research in schizophrenia ?

- A. Maurer D
- B. Sachs GS
- C. Kraepelin E
- D. Kohn R

Dementia praecox, a term used by Emil Kraepelin, was replaced by Eugen Bleuler who called those closely related diseases characterized not by deterioration of intellect but by splitting of cognitive sides of personality from the affective or emotional sides by the name of schizophrenia. Kraepelin and Bleuler were the first to suggest that schizophrenia is an organic brain disease with significant cognitive deficits.

1959 Worldwide lifetime prevalence of schizophrenia is ?

Harrison’s 18th Ed. 3523

- A. 1 %
- B. 2 %
- C. 3 %
- D. 4 %

Schizophrenia is a sporadic or familial mental disorder of yet unknown etiology. It occurs in all ethnic populations with a worldwide lifetime prevalence of ~1 %. Schizophrenia affects males and females roughly equally.

1960 Schizophrenia presents typically in ?

Harrison’s 18th Ed. 3542

- A. Early childhood
- B. Late adolescence
- C. Middle age
- D. Old age

Schizophrenia presents typically in late adolescence and early adulthood as a lifelong phenomenon.

1961 Which of the following about schizophrenia is false ?

Harrison’s 18th Ed. 3542

- A. Equal prevalence rates in men & women
- B. Peak age of onset is in III decade of life
- C. Rate of completed suicide is about 10%
- D. None of the above

1962 Mostly, people do not get schizophrenia after the age of ?

N Engl J Med 2003;349:1738-49

- A. 15 years
- B. 25 years
- C. 35 years
- D. 45 years

Mostly, people do not get schizophrenia after the age of 45 years.

1963 Area of the brain that are predominantly and consistently affected in schizophrenia is ?

N Engl J Med 2003;349:1738-49

- A. Amygdala
- B. Anterior & medial nuclei of thalamus
- C. Dorsolateral prefrontal cortex (DLPFC)
- D. All of the above

1964 Which of the following cortical layers is thinner than normal in schizophrenia ?

N Engl J Med 2003;349:1738-49

- A. I
- B. II
- C. IV
- D. V

Cortical layers II and III are thinner than normal in schizophrenia.

1965 Which of the following is not a structural abnormality in brain of schizophrenia individuals ?

N Engl J Med 2003;349:1738-49

- A. Ventricular enlargement
- B. Absence of glial proliferation

- C. Reduction in neuropil
- D. Decreased volume of Nucleus accumbens

1966 Which of the following recreational drugs can mimic symptoms of schizophrenia in healthy individuals ?

N Engl J Med 2003;349:1738-49

- A. Amphetamine
- B. Phencyclidine (PCP)
- C. Lysergic acid diethylamide (LSD)
- D. All of the above

1967 Which of the following is related to the increased occurrence of schizophrenia ?

N Engl J Med 2003;349:1738-49

- A. Tsunami
- B. Plague epidemic
- C. Nuclear holocaust in Japan
- D. Dutch hunger winter

During severe famine, pregnant mothers tend to deliver children who have an increased incidence of schizophrenia later in their life. This observation stems from the experiences of the "Dutch hunger winter" during 1944 – 1945.

1968 The most prevalent excitatory transmitter in brain is ?

N Engl J Med 2003;349:1738-49

- A. GABA
- B. Glutamate
- C. Serotonin
- D. Dopamine

Most prevalent transmitter in the human brain is glutamate. It is mostly excitatory at synapses.

1969 Most prevalent inhibitory transmitter in brain is ?

N Engl J Med 2003;349:1738-49

- A. GABA
- B. Glutamate
- C. Serotonin
- D. Dopamine

Neurotransmitter is γ -amino-butyric acid (GABA) is mostly inhibitory at the synapses.

1970 Serotonergic neurons in the CNS are found primarily in ?

N Engl J Med 2003;349:1738-49

- A. Midline raphe nuclei
- B. Locus coeruleus
- C. Striatum
- D. Thalamus

Serotonergic neurons in the CNS are found primarily in the midline raphe nuclei, located in the brain stem from the midbrain to the medulla.

1971 Principal site for synthesis of norepinephrine in human brain is ?

N Engl J Med 2003;349:1738-49

- A. Midline raphe nuclei
- B. Locus coeruleus
- C. Striatum
- D. Thalamus

Locus coeruleus is the principal site for synthesis of norepinephrine (NE) that has an excitatory effect on most of the brain.

1972 Which of the following is a dopamine pathway in the brain ?

N Engl J Med 2003;349:1738-49

- A. Mesolimbic
- B. Mesocortical
- C. Nigrostriatal
- D. All of the above

Dopamine pathways in the brain are mesolimbic, mesocortical, nigrostriatal & tuberoinfundibular.

1973 Dopaminergic fibers in brain arise in which of the following ?

N Engl J Med 2003;349:1738-49

- A. Amygdala
- B. Hippocampus
- C. Ventral tegmental area (VTA)
- D. Nucleus accumbens

Dopaminergic fibers in brain arise in the ventral tegmental area (VTA).

1974 Which of the following dopamine receptor subtype is excitatory ?

N Engl J Med 2003;349:1738-49

- A. D1
- B. D2
- C. D3
- D. D4

Dopamine receptor subtypes D1 and D5 are excitatory while D2, D3 and D4 are inhibitory.

1975 Which of the following dopamine receptor subtype is most abundant in nucleus accumbens ?

N Engl J Med 2003;349:1738-49

- A. D1
- B. D2
- C. D3
- D. D4

D3 receptors are mainly present in nucleus accumbens while D4 receptors express themselves in frontal cortex. D1 receptors tend to be distributed in cortical regions, while D2 are subcortical.

1976 Schizophrenia is characterized by ?

Harrison's 17th Ed. 2721

- A. Hypodopaminergia in mesocortical neurons
- B. Hyperdopaminergia in mesocortical neurons
- C. Hypodopaminergia in mesolimbic neurons
- D. None of the above

Schizophrenia is characterized by hypodopaminergia in mesocortical neurons and hyperdopaminergia in mesolimbic neurons.

1977 Which of the following is an ionotropic glutamate receptor ?

N Engl J Med 2003;349:1738-49

- A. AMPA
- B. Kainate
- C. NMDA
- D. All of the above

Ionotropic glutamate receptors (iGluRs) are AMPA (a-amino-3-hydroxy-5-methyl-4-isoxazole propionic acid), kainate, and NMDA.

1978 AMPA-receptor subunits are derived from which of the following genes ?

N Engl J Med 2003;349:1738-49

- A. GluR4
- B. GluR5
- C. GluR6
- D. GluR7

AMPA-receptor subunits are derived from GluR1, GluR2, GluR3 and GluR4 genes. Kainate receptors are derived from GluR5, GluR6, GluR7 and KA1, KA2 genes. NMDA receptor subunits are encoded by NR1, NR2A, NR2B, NR2C, NR2D genes.

1979 Glycine co-agonist essential for glutamatergic transmission is ?

N Engl J Med 2003;349:1738-49

- A. Tyrosine
- B. Serenine
- C. Melanin
- D. D-serine

1980 Serotonin is produced from ?

N Engl J Med 2003;349:1738-49

- A. Arginine
- B. L-tryptophan
- C. Histidine
- D. Leucine

Serotonin is produced by decarboxylation & hydroxylation of L-tryptophan.

1981 Which of the following hallucinogen is a 5-HT agonist ?

N Engl J Med 2003;349:1738-49

- A. Amphetamine
- B. LSD (lysergic acid diethylamide)
- C. Ketamine
- D. All of the above

Hallucinogen LSD (lysergic acid diethylamide) is a 5-HT agonist.

1982 GABA is synthesized from ?

N Engl J Med 2003;349:1738-49

- A. Glutamic acid
- B. Butyric acid
- C. Sialic acid
- D. Glycine

GABA is synthesized from glutamic acid by removal of alpha-carboxyl group from glutamate by the action of glutamic acid decarboxylase (GAD).

1983 Which of the following is a pathognomonic feature of schizophrenia ?

Harrison's 18th Ed. 3542

- A. Perturbations of language
- B. Perturbations of perception
- C. Perturbations of thinking
- D. None of the above

There are no pathognomonic features of schizophrenia.

1984 Which of the following is not a typical feature of schizophrenia ?

Harrison's 18th Ed. 3543

- A. Bizzare psychosis
- B. Frequent mood disturbances
- C. Hypervigilance

- D. Altered short term memory

Features that preclude the diagnosis of schizophrenia are significant mood symptoms, any relevant medical disease, temporal-lobe epilepsy, evidence of substance abuse and drug reaction. Delusions & hallucinations of schizophrenia are more complex & bizarre than those of dementia.

1985 Which of the following diseases can begin with schizophrenia-like features ?

Harrison's 17th Ed. 2721

- A. Frontotemporal dementia
- B. Huntington's disease
- C. Alzheimer's disease
- D. All of the above

FTD, HD, vascular dementia, Dementia with Lewy bodies (DLB), AD, or leukoencephalopathy can begin with schizophrenia-like features.

1986 Which of the following is false about the negative symptoms of schizophrenia ?

Harrison's 18th Ed. 3542

- A. Carry a poor long-term outcome
- B. Respond inadequately to drug treatment
- C. Develop prior to positive symptoms
- D. None of the above

Negative symptoms carry a poor long-term outcome and a respond inadequately to drug treatment. Negative symptoms develop prior to positive symptoms.

1987 Which of the following is not a schizophrenia subtype ?

Harrison's 18th Ed. 3543

- A. Catatonic
- B. Atonic
- C. Paranoid
- D. Residual

Four subtypes of schizophrenia are catatonic, paranoid, disorganized, and residual.

1988 In which of the following subtypes of schizophrenia, negative symptomatology exists in the absence of delusions, hallucinations, or motor disturbance ?

Harrison's 18th Ed. 3543

- A. Catatonic
- B. Disorganized
- C. Paranoid
- D. Residual

In residual-type subtype of schizophrenia, negative symptomatology exists in the absence of delusions, hallucinations, or motor disturbance.

1989 Echolalia or echopraxia os a feature of which of the following subtypes of schizophrenia ?

Harrison's 18th Ed. 3543

- A. Catatonic
- B. Disorganized
- C. Paranoid
- D. Residual

Catatonic subtype patients have profound changes in motor activity, negativism & echolalia or echopraxia.

1990 Patients with symptoms of schizophrenia and independent periods of mood disturbance are called ?

Harrison's 18th Ed. 3543

- A. Schizoaffective disorder

- B. Schizophreniform disorder
- C. Schizocognitive disorder
- D. Schizopolar disorder

Patients with symptoms of schizophrenia and independent periods of mood disturbance are termed to have schizoaffective disorder. Schizotypal and schizoid personality disorders refers to individuals who show a lifetime pattern of social & interpersonal deficits (inability to form close interpersonal relationships, eccentric behavior, and mild perceptual distortions).

1991 Which of the following genes is associated with schizophrenia ?

Harrison's 18th Ed. 3524

- A. DISC1
- B. NRG1
- C. Reelin
- D. All of the above

Schizophrenia candidate genes include DISC1, NRG1, Reelin, DAOA, DTNBP1, RGS4.

1992 What percentage of schizophrenic patients commit suicide ?

Harrison's 18th Ed. 3543

- A. 10 %
- B. 20 %
- C. 30 %
- D. 40 %

About 10% of schizophrenic patients commit suicide.

1993 Which out of the following prescription medications is frequently associated with symptoms of schizophrenia ?

Harrison's 18th Ed. 3543

- A. Clonidine
- B. Lorazepam
- C. Tizanidine
- D. Reserpine

Most common prescription medications associated with symptoms of schizophrenia are clonidine, quinacrine, and procaine derivatives.

1994 Risk factors for schizophrenia include all except ?

Harrison's 17th Ed. 2721

- A. Summer birth
- B. Increasing paternal age
- C. Prenatal nutritional deficiency
- D. Intrauterine exposure to viral infection.

Risk factors for schizophrenia include urban birth, winter birth, migration, increasing paternal age, fetal hypoxia, maternal-fetal Rhesus blood-group incompatibility, prenatal nutritional deficiency & intrauterine exposure to viral infection.

1995 Among monozygotic twins, the incidence of schizophrenia is ?

Harrison's 18th Ed. 3543

- A. ~ 25 %
- B. ~ 50 %
- C. ~ 75 %
- D. ~ 100 %

Among twins, the incidence of schizophrenia is ~10% in dizygotic twins of affected individuals, and ~50% in monozygotic twins.

1996 If both parents are affected with schizophrenia, the risk for offspring is ?

Harrison's 18th Ed. 3543

- A. 20 %

- B. 40 %
- C. 60 %
- D. 80 %

If both parents are affected with schizophrenia, the risk for offspring is 40%.

1997 Which of the following scales is used for severity of clinical symptoms of schizophrenia ?

N Engl J Med 2003;349:1738-49

- A. ESRS
- B. BAS
- C. PANSS
- D. LNS

Positive and Negative Syndrome Scale (PANSS) is used for severity of clinical symptoms of schizophrenia. Brown–Peterson procedure and the Letter-Number Sequencing (LNS) task are measures of verbal working memory. Extrapyramidal Symptom Rating Scale (ESRS) and the Barnes Akathisia Scale (BAS) are used to assess movement disorders that occur with antipsychotic medication of schizophrenia.

1998 Reduction in volume of which of the following correlate with positive symptoms of schizophrenia ?

N Engl J Med 2003;349:1738-49

- A. Medial temporal lobes (MTL)
- B. Superior temporal gyrus (STG)
- C. Hippocampus
- D. Amygdala

Reduction in volume of superior temporal gyrus correlate with positive symptoms of schizophrenia while MTL reductions correlate with memory impairment.

1999 Term neuroleptic in Greek means ?

N Engl J Med 2003;349:1738-49

- A. To straighten the neuron
- B. To clasp the neuron
- C. To thin the neuron
- D. To energise the neuron

Term neuroleptic in Greek means "to clasp the neuron".

2000 Which of the following is not a typical antipsychotic drug ?

Harrison's 18th Ed. 3544 Table 391-14

- A. Haloperidol
- B. Risperidone
- C. Chlorpromazine
- D. Thiothixene

2001 Which of the following is not an atypical antipsychotic drug ?

Harrison's 18th Ed. 3544 Table 391-14

- A. Ziprasidone
- B. Perphenazine
- C. Amisulpride
- D. Aripiprazole

First-generation or "typical" antipsychotic agents include Chlorpromazine, Perphenazine, Trifluoperazine, Thiothixene and Haloperidol. Second-generation or "atypical" antipsychotic agents are Clozapine, Risperidone, Olanzapine, Quetiapine, Ziprasidone, Aripiprazole and Amisulpride. Intramuscular depot preparations available are Fluphenazine decanoate, Haloperidol decanoate, Flupentixol decanoate and Risperidone microspheres.

2002 Agranulocytosis is a side effect of which of the following antipsychotic drug ?

Harrison's 18th Ed. 3544 Table 391-14

- A. Olanzapine
- B. Clozapine
- C. Quetiapine
- D. Chlorpromazine

2003 In UK, Clozaril Patient Monitoring Services (CPMS) monitors patient's ?

N Engl J Med 2003;349:1738-49

- A. Hematological profile
- B. Weight gain
- C. Lenticular opacities
- D. Myocarditis

In UK, it is mandatory for all patients receiving Clozapine to register with Clozaril Patient Monitoring Services (CPMS) that monitors patient's hematological profile.

2004 Which of the following antipsychotic drug is unlikely to increase prolactin levels ?

Harrison's 18th Ed. 3544

- A. Aripiprazole
- B. Clozapine
- C. Ziprasidone
- D. None of the above

2005 In schizophrenia, if antipsychotic medications are completely discontinued, the relapse rate is ?

Harrison's 18th Ed. 3543

- A. 1% per month
- B. 5% per month
- C. 10% per month
- D. 20% per month

If antipsychotic medications are completely discontinued in schizophrenia, the relapse rate is 60% within 6 months or 10% per month, until eventually almost all patients undergo relapse.

2006 Use of which of the following is least likely to cause hyperglycemia, weight gain, and hypertriglyceridemia ?

Harrison's 18th Ed. 3543

- A. Clozapine
- B. Ziprasidone
- C. Olanzapine
- D. Quetiapine

Clozapine, olanzapine & quetiapine cause hyperglycemia, weight gain & hypertriglyceridemia more than Ziprasidone.

2007 Which of the following may reduce tardive dyskinesia with the use of antipsychotic agents if given early in the syndrome ?

Harrison's 18th Ed. 3545

- A. Vitamin E
- B. Vitamin B12
- C. Zinc
- D. Calcium

Vitamin E may reduce abnormal involuntary movements with the use of antipsychotic agents, if given early in the syndrome.

2008 Which of the following is most commonly involved in tardive dyskinesia (TD) ?

Harrison's 18th Ed. 3544

- A. Tongue

- B. Trunk
- C. Limbs
- D. Respiratory muscles

TD comprises of choreiform movements involving mouth, lips & tongue. In severe cases trunk, limbs & respiratory muscles may be affected.

2009 Sleep disturbance in chronic schizophrenia includes ?

Harrison's 17th Ed. 2723

- A. Day-night reversal
- B. Sleep fragmentation
- C. Insomnia
- D. All of the above

2010 Which of the following anti-malarials should not be prescribed to patients of schizophrenia ?

Harrison's 17th Ed. 2723

- A. Quinine
- B. Lumefantrine
- C. Mefloquine
- D. Primaquine

Mefloquine should not be prescribed to patients with depression, generalized anxiety disorder, psychosis, schizophrenia, and seizure disorder.

2011 Dysthymia best relates to ?

Harrison's 18th Ed. 3524

- A. Depressive disorder
- B. Bipolar disorder
- C. Seizure disorder
- D. Schizophrenia

Mood disorders can be either depressive or bipolar disorders. Depressive disorders include the major & minor depressive disorders and dysthymia

2012 Which of the following is one of the most heritable of psychiatric illnesses ?

Harrison's 18th Ed. 3525

- A. Depressive disorder
- B. Bipolar disorder
- C. Posttraumatic stress disorder (PTSD)
- D. Schizophrenia

Bipolar disorder (episodes of mania & depression) is one of the most heritable of psychiatric illnesses, with genetic risk of 80%.

2013 Neurovegetative symptoms best relate to ?

Harrison's 18th Ed. 3525

- A. Depressive disorder
- B. Bipolar disorder
- C. Posttraumatic stress disorder (PTSD)
- D. Schizophrenia

Symptoms of depression are referred to as neurovegetative symptoms.

2014 Deep brain stimulation (DBS) of which of the following elevates mood in normal and depressed individuals ?

Harrison's 18th Ed. 3525

- A. Subgenual area 23
- B. Subgenual area 24
- C. Subgenual area 25

D. Subgenual area 26

Deep brain stimulation (DBS) of either nucleus accumbens or subgenual area 25 elevates mood in normal and depressed individuals.

391 - Mental Disorders

2015 General medical condition leading to mental disorders is denoted by which of the following in the multiaxial system of classification ?

Harrison's 18th Ed. 3529

- A. Axis I
- B. Axis II
- C. Axis III
- D. Axis IV

2016 In DSM-IV-PC, axis III disorders refer to ?

Harrison's 18th Ed. 3529

- A. Presence or absence of a major mental disorder
- B. Any underlying personality disorder
- C. General medical condition
- D. Psychosocial and environmental problems

The revised fourth edition for use by primary care physicians of the Diagnostic and Statistical Manual (DSM-IV-PC) provides the current multiaxial system of classification. Presence or absence of a major mental disorder (axis I), any underlying personality disorder (axis II), general medical condition (axis III), psychosocial and environmental problems (axis IV), and overall rating of general psychosocial functioning (axis V).

2017 Subjective sense of unease best relates to ?

Harrison's 18th Ed. 3529

- A. Anxiety
- B. Panic attack
- C. Obsessive-compulsive disorder
- D. All of the above

Anxiety disorders are the most prevalent psychiatric illnesses. Anxiety is defined as a subjective sense of unease, dread, or foreboding.

2018 Agoraphobia commonly accompanies ?

Harrison's 18th Ed. 3529

- A. Anxiety disorder
- B. Panic disorder
- C. Obsessive-compulsive disorder
- D. All of the above

Agoraphobia occurs commonly in patients with panic disorder. It is an acquired irrational fear of being in places where one might feel trapped or unable to escape.

2019 Which of the following can evoke an attack of panic disorder ?

Harrison's 18th Ed. 3530

- A. Intravenous infusion of sodium lactate
- B. Carbon dioxide inhalation
- C. Cholecystokinin tetrapeptide (CCK-4)
- D. All of the above

IV sodium lactate, α_2 -adrenergic antagonist yohimbine, cholecystokinin tetrapeptide (CCK-4), and carbon dioxide inhalation evoke a panic attack in panic disorder patients by activating a pathway involving noradrenergic neurons in locus coeruleus and serotonergic neurons in dorsal raphe. Agents that block serotonin reuptake can prevent attacks.

2020 Which of the following is a serotonin-norepinephrine reuptake inhibitor (SNRI) ?

Harrison's 18th Ed. 3530

- A. Fluoxetine
- B. Venlafaxine
- C. Paroxetine
- D. Sertraline

Fluoxetine, paroxetine, sertraline are selective serotonin reuptake inhibitors (SSRIs), and venlafaxine is a serotonin-norepinephrine reuptake inhibitor (SNRI).

2021 Which of the following tricyclic antidepressants (TCA) is best tolerated, especially by elderly ?

Harrison's 18th Ed. 3531 Table 391-3

- A. Amitriptyline
- B. Nortriptyline
- C. Imipramine
- D. Doxepin

2022 MAOIs should not be used concomitantly with ?

Harrison's 18th Ed. 3531, 3539 Table 391-3

- A. Selective serotonin reuptake inhibitors (SSRIs)
- B. Serotonin-norepinephrine reuptake inhibitor (SNRI)
- C. Tricyclic antidepressants (TCA)
- D. All of the above

MAOIs should not be used concomitantly with SSRIs, because of the risk of serotonin syndrome, or with TCAs, because of possible hyperadrenergic effects.

2023 Which of the following is a mixed norepinephrine/serotonin reuptake inhibitors and receptor blocker ?

Harrison's 18th Ed. 3531 Table 391-3

- A. Venlafaxine
- B. Duloxetine
- C. Mirtazapine
- D. All of the above

Venlafaxine, Desvenlafaxine, Duloxetine, Mirtazapine are mixed norepinephrine/serotonin reuptake inhibitors and receptor blockers.

2024 Which of the following is a monoamine oxidase inhibitor (MAOI) ?

Harrison's 18th Ed. 3531 Table 391-3

- A. Amoxapine
- B. Bupropion
- C. Phenelzine
- D. Trazodone

Phenelzine, Tranylcypromine, Isocarboxazid, and Transdermal selegiline are MAOI.

2025 Extrapyramidal symptoms can appear with the use of ?

Harrison's 18th Ed. 3531 Table 391-3

- A. Amoxapine
- B. Bupropion
- C. Phenelzine
- D. Trazodone

2026 Which of the following anxiolytic drugs has no active metabolite ?

Harrison's 18th Ed. 3533 Table 391-6

- A. Oxazepam

- B. Temazepam
- C. Clonazepam
- D. All of the above

Oxazepam, Temazepam, Clonazepam, Lorazepam, and Triazolam have no active metabolites. Diazepam, Alprazolam, Chlordiazepoxide, and Buspirone have active metabolites.

2027 Which of the following is to be avoided when monoamine oxidase inhibitors (MAOIs) are used ?

Harrison's 18th Ed. 3530

- A. Tobacco
- B. Coffee
- C. Wine
- D. Whisky

Patients taking monoamine oxidase inhibitors (MAOIs) need to maintain a low-tyramine diet i.e. avoidance of cheese and wine.

2028 Benzodiazepines should not be prescribed for more than how many weeks to avoid risk of abuse and dependence ?

Harrison's 18th Ed. 3532

- A. 1 - 2 weeks
- B. 2 - 3 weeks
- C. 3 - 4 weeks
- D. 4 - 6 weeks

Benzodiazepines should not be prescribed for >4 - 6 weeks because of the development of tolerance and the risk of abuse and dependence.

2029 Which of the following is not a long-acting benzodiazepine ?

Harrison's 18th Ed. 3532

- A. Diazepam
- B. Alprazolam
- C. Flurazepam
- D. Clonazepam

Longer-acting benzodiazepines are diazepam, chlordiazepoxide, flurazepam, and clonazepam. Shorter-acting benzodiazepines are alprazolam and oxazepam. It is more difficult to taper patients off shorter-acting benzodiazepines.

2030 Which of the following is a nonbenzodiazepine anxiolytic agent ?

Harrison's 18th Ed. 3533

- A. Diazepam
- B. Buspirone
- C. Flurazepam
- D. Clonazepam

Buspirone is a nonbenzodiazepine anxiolytic agent. It is nonsedating, does not produce tolerance or dependence, does not interact with benzodiazepine receptors or alcohol, and has no abuse or disinhibition potential. But, requires several weeks to take effect and thrice-daily dosing.

2031 Which of the following anticonvulsants with GABAergic properties is beneficial in anxiety-related syndromes ?

Harrison's 18th Ed. 3533

- A. Gabapentin
- B. Pregabalin
- C. Divalproex
- D. All of the above

Anticonvulsants with GABAergic properties like gabapentin, oxcarbazepine, tiagabine, pregabalin, and divalproex are beneficial in anxiety-related syndromes.

2032 Obsessive-compulsive disorder (OCD), obsession pertains to ?

Harrison's 18th Ed. 3535

- A. Thoughts
- B. Actions
- C. Behaviour
- D. All of the above

Obsessive-compulsive disorder (OCD) is characterized by obsessive thoughts and compulsive behaviors that impair everyday functioning.

2033 Obsessive-compulsive disorder (OCD) is related to which of the following clinical conditions ?

Harrison's 18th Ed. 3535

- A. Wilson's Disease
- B. Myoclonus
- C. Tourette's Syndrome
- D. Parkinson's disease

Family studies show an aggregation of OCD with Tourette's disorder. Both are more common in males and in first-born children.

2034 Which of the following part of the brain is responsible for acquisition and maintenance of habit and skill learning ?

Harrison's 18th Ed. 3535

- A. Hippocampus
- B. Amygdala
- C. Caudate nucleus
- D. Mamillary bodies

Anatomical localization of obsessive-compulsive behavior is to orbital frontal cortex, caudate nucleus, & globus pallidus. Caudate nucleus is involved in acquisition & maintenance of habit & skill learning.

2035 Which of the following is useful in the treatment of obsessive-compulsive disorder (OCD) ?

Harrison's 18th Ed. 3535

- A. Clomipramine
- B. Fluoxetine
- C. Fluvoxamine
- D. All of the above

Clomipramine, fluoxetine, fluvoxamine, and sertraline are useful in the treatment of OCD. In treatment-resistant cases, augmentation with buspirone, neuroleptic or benzodiazepine is beneficial and in severe cases deep brain stimulation is effective.

2036 Which of the following can produce hyperglycemia and carbohydrate craving ?

Harrison's 18th Ed. 3536

- A. MAOI
- B. TCAs
- C. SSRIs
- D. All of the above

MAOIs can induce hypoglycemia and weight gain, while TCAs can produce hyperglycemia and carbohydrate craving. SSRIs, like MAOIs, may reduce fasting plasma glucose.

2037 In patients with depression, mood is worse in ?

Harrison's 18th Ed. 3536

- A. Morning
- B. Afternoon
- C. Evening

D. Night

Major depression is defined as depressed mood on a daily basis for a minimum duration of 2 weeks. Patients with depression often notice a diurnal variation in mood, worse in morning hours.

2038 Presence of which of the following significantly increases near-term suicidal risk in depressed patients ?

Harrison's 18th Ed. 3536

- A. Anxiety
- B. Agitation
- C. Panic
- D. All of the above

Presence of anxiety, panic, or agitation significantly increases near-term suicidal risk in depressed patients.

2039 Neuroendocrine abnormality that reflect neurovegetative signs & symptoms of depression is ?

Harrison's 18th Ed. 3537

- A. Increased cortisol & CRH secretion
- B. Increase in adrenal size
- C. Decreased inhibitory response of glucocorticoids to dexamethasone
- D. All of the above

Neuroendocrine abnormalities that reflect the neurovegetative signs & symptoms of depression include increased cortisol and corticotropin-releasing hormone (CRH) secretion, increase in adrenal size, decreased inhibitory response of glucocorticoids to dexamethasone and blunted response of thyroid-stimulating hormone (TSH) level to infusion of thyroid-releasing hormone (TRH). Antidepressant treatment normalises these abnormalities. Major depression is also associated with an upregulation of proinflammatory cytokines, which also normalizes with antidepressant treatment.

2040 Sleep abnormality in patients with major depression is ?

Harrison's 18th Ed. 3537

- A. Decrease in REM sleep
- B. Increase in REM density
- C. Decrease in stage IV delta slow-wave sleep
- D. All of the above

Patients with major depression show a decrease in rapid eye movement (REM) sleep onset (REM latency), an increase in REM density, and, a decrease in stage IV delta slow-wave sleep.

2041 Which of the following is an ideal antidepressant ?

Harrison's 18th Ed. 3538

- A. SSRI
- B. TCA
- C. MAOI
- D. None of the above

There is no ideal antidepressant. No current compound combines rapid onset of action, moderate half-life, a meaningful relationship between dose & blood level, a low side effect profile, minimal interaction with other drugs, and safety in overdose.

2042 Principal active metabolite of Fluoxetine is ?

Harrison's 18th Ed. 3538

- A. Isofluoxetine
- B. Parfluoxetine
- C. Norfluoxetine
- D. Metafluoxetine

Principal active metabolite of Fluoxetine is Norfluoxetine.

2043 Which of the following is false about serotonin syndrome ?

Harrison's 18th Ed. 3538

- A. Myoclonus

B. Abdominal cramping

C. Hyperpyrexia

D. Hypotension

MAOIs used concomitantly with SSRIs can lead to serotonin syndrome that results from hyperstimulation of brainstem 5HT_{1A} receptors and is characterized by myoclonus, agitation, abdominal cramping, hyperpyrexia, hypertension, and potentially death.

2044 Which of the following is useful in managing treatment-resistant depression ?

Harrison's 18th Ed. 3539

- A. Transcranial magnetic stimulation (TMS)
- B. Vagus nerve stimulation (VNS)
- C. Deep brain stimulation (DBS)
- D. All of the above

Electroconvulsive therapy, Transcranial magnetic stimulation (TMS), Vagus nerve stimulation (VNS) and Deep brain stimulation (DBS) are useful in managing treatment resistant depression.

2045 Response to treatment of depression should be evaluated after how many months ?

Harrison's 18th Ed. 3539

- A. 1 month
- B. 2 month
- C. 3 month
- D. 6 month

Regardless of the modality of treatment for depression, response should be evaluated after 2 months.

2046 Which of the following distinguish bipolar I mania from bipolar II hypomania ?

N Engl J Med 2011;364:51-9

- A. Suicidal tendency
- B. Voluntarily produced physical symptoms of illness
- C. Severity of elevated mood
- D. Intentionally produced deficit symptoms

The greater severity of elevated mood and associated functional disability distinguish bipolar I mania (which is characterized by psychosis, the need for urgent care or hospitalization, or marked impairment) from bipolar II hypomania.

2047 Montgomery and Åsberg Depression Rating Scale (MADRS) ranges from ?

N Engl J Med 2011;364:51-9

- A. 0 to 20
- B. 0 to 40
- C. 0 to 60
- D. 0 to 80

Montgomery and Åsberg Depression Rating Scale [MADRS] ranges from 0 to 60.

2048 Term rapid cycling is used for patients who have how many episodes of either depression or mania in a given year ?

Harrison's 18th Ed. 3540

- A. One or more
- B. Two or more
- C. Three or more
- D. Four or more

Term rapid cycling is used for patients who have four or more episodes of either depression or mania in a given year.

2049 In bipolar disorders, which of the following is effective in the depressed phase ?

Harrison's 18th Ed. 3540

- A. Lithium carbonate
- B. Sodium valproate
- C. Olanzapine
- D. Lamotrigine

Lithium carbonate is the mainstay of treatment in bipolar disorder. Sodium valproate & olanzapine are equally effective in acute mania, as is lamotrigine in the depressed phase.

2050 Which of the following is not a side effect of lithium therapy ?

Harrison's 18th Ed. 3540

- A. Weight loss
- B. Alopecia
- C. Antithyroid effect
- D. Polyuria

Side effects of lithium include gastrointestinal discomfort, nausea, diarrhea, polyuria, weight gain, skin eruptions, alopecia, edema, and antithyroid effect.

2051 Therapeutic blood levels of lithium in the treatment of acute mania is ?

Harrison's 18th Ed. 3540 Table 391-11

- A. 0.4 - 0.8 meq / L
- B. 0.8 - 1.2 meq / L
- C. 1.4 - 2.2 meq / L
- D. 2.5 - 3.2 meq / L

In the treatment of acute mania, lithium is initiated at 300 mg bid or tid. Dose is titrated every 2 - 3 days to achieve blood levels of 0.8 - 1.2 meq/L.

2052 Therapeutic blood levels of valproic acid is ?

Harrison's 18th Ed. 3540 Table 391-11

- A. 50 - 125 µg/mL
- B. 100 - 225 µg/mL
- C. 200 - 350 µg/mL
- D. 380 - 525 µg/mL

2053 Therapeutic blood levels of carbamazepine is ?

Harrison's 18th Ed. 3540 Table 391-11

- A. 1 - 4 µg/mL
- B. 4 - 12 µg/mL
- C. 12 - 22 µg/mL
- D. 25 - 42 µg/mL

2054 Which of the following drugs is appropriate for patients who experience rapid cycling ?

Harrison's 18th Ed. 3541

- A. Lithium carbonate
- B. Sodium valproate
- C. Olanzapine
- D. Lamotrigine

Valproic acid is better for patients who experience rapid cycling (> 4 episodes a year) or who present with a mixed or dysphoric mania.

2055 In somatization disorder, which of the following is true to fulfill the diagnostic criteria ?

Harrison's 18th Ed. 3541 Table 391-13

- A. 2 pain, 2 GI, 2 sexual, & 2 pseudoneurologic symptom

- B. 3 pain, 2 GI, 2 sexual, & 1 pseudoneurologic symptom
- C. 3 pain, 2 GI, 1 sexual, & 2 pseudoneurologic symptom
- D. 4 pain, 2 GI, 1 sexual, & 1 pseudoneurologic symptom

Formal diagnostic criteria for somatization disorder requires the recording of at least four pain, two gastrointestinal, one sexual, and one pseudoneurologic symptom.

2056 In conversion disorder, deficit symptoms involve ?

Harrison's 18th Ed. 3542

- A. Motor
- B. Sensory
- C. Psychological
- D. All of the above

In conversion disorder, deficit symptoms are not intentionally produced or simulated and involve motor or sensory function & psychological factors that initiate or exacerbate medical presentation.

2057 Which of the following best relates to hypochondriasis ?

Harrison's 18th Ed. 3542

- A. Voluntarily produced physical symptoms of illness
- B. Belief of serious medical illness
- C. Intentionally produced deficit symptoms
- D. Simulated deficit symptoms

In factitious disorder (malingering), patient consciously & voluntarily produces physical symptoms of illness. Essential feature in hypochondriasis is a belief of serious medical illness that persists despite reassurance & appropriate medical evaluation.

2058 Munchausen's syndrome best relates to ?

Harrison's 18th Ed. 3542

- A. Factitious disorder
- B. Hypochondriasis
- C. Conversion disorder
- D. All of the above

Munchausen's syndrome is characterized by dramatic, chronic, or severe factitious illness for a desire for some external reward such as a narcotic medication or disability reimbursement.

2059 Which of the following is required for the diagnosis of borderline personality disorder ?

N Engl J Med 2011;364:2037-42

- A. Interpersonal hypersensitivity
- B. Impulsivity
- C. Affective dysregulation
- D. All of the above

2060 Most distinctive characteristic of patients with BPD is ?

N Engl J Med 2011;364:2037-42

- A. Excessive involvement in pleasurable activities
- B. Decreased need for sleep
- C. Hypersensitivity to rejection
- D. Inflated self-esteem or grandiosity

Most distinctive characteristics of patients with BPD are their hypersensitivity to rejection and their fearful preoccupation with expected abandonment.

2061 Which of the following is not a feature of personality disorders ?

Harrison's 18th Ed. 3542

- A. Characteristic patterns of thinking & feeling
- B. Relative flexibility
- C. Significant functional impairment

- D. Subjective distress

Personality disorders are characteristic patterns of thinking, feeling & interpersonal behavior that are relatively inflexible & cause significant functional impairment or subjective distress.

2062 Obsessive-compulsive personality types is grouped in which personality cluster disorder ?

Harrison's 18th Ed. 3542

- A. Cluster A
- B. Cluster B
- C. Cluster C
- D. Any of the above

2063 Paranoid personality type is grouped in which personality cluster disorder ?

Harrison's 18th Ed. 3542

- A. Cluster A
- B. Cluster B
- C. Cluster C
- D. Any of the above

2064 Antisocial personality type is grouped in which personality cluster disorder ?

Harrison's 18th Ed. 3542

- A. Cluster A
- B. Cluster B
- C. Cluster C
- D. Any of the above

Personality disorders are grouped into 3 overlapping clusters. Cluster A includes paranoid (unjustified pervasive mistrust & suspiciousness), schizoid, and schizotypal personality disorders. Cluster B disorders include antisocial, borderline, histrionic & narcissistic types (impulsive behavior, excessively emotional, erratic). Cluster C includes avoidant, dependent & obsessive-compulsive personality types.

2065 In Mini Mental Status Examination, scoring is done out of ?

Harrison's 16th Ed. 2397

- A. 20
- B. 30
- C. 40
- D. 50

2066 Depressive episodes that occur in conjunction with manic episodes are called ?

N Engl J Med 2005;353:1819-34

- A. Anxiety disorders
- B. Schizophrenic disorders
- C. Bipolar disorders
- D. Major depressive disorders

2067 "Dysthymia" is the term used for ?

N Engl J Med 2005;353:1819-34

- A. Persistent, residual depressive symptoms
- B. Generalized weakness
- C. Absence of sweating
- D. Difficulty in swallowing

2068 As regards risk of problems in depressed patients, which of the following statements is true ?

N Engl J Med 2005;353:1819-34

- A. Suicide
- B. Heart disease
- C. Stroke
- D. All of the above

2069 Which of the following about depression is false ?

N Engl J Med 2005;353:1819-34

- A. Elevated cortisol levels
- B. Higher levels of N-acetyl aspartate
- C. Deficiencies of serotonin, norepinephrine, dopamine & GABA
- D. Overactivity of acetylcholine, corticotropin-releasing factor, and substance P

2070 Disordered neurocircuitry in depression is observed in which of the following structures ?

N Engl J Med 2005;353:1819-34

- A. Anterior and posterior cingulate cortex
- B. Ventral, medial, and dorsolateral prefrontal cortex
- C. Insula
- D. All of the above

2071 Disordered neurocircuitry in depression is observed in which of the following structures ?

N Engl J Med 2005;353:1819-34

- A. Ventral striatum
- B. Hippocampus
- C. Medial thalamus
- D. All of the above

2072 Tricyclic antidepressants have greater efficacy than SSRIs in ?

N Engl J Med 2005;353:1819-34

- A. Severe major depressive disorder
- B. Depression with melancholic features
- C. Depression in which physical symptoms or pain are prominent
- D. All of the above

2073 Which of the following drugs has no direct action on the serotonin system ?

N Engl J Med 2005;353:1819-34

- A. Bupropion
- B. Venlafaxine
- C. Duloxetine
- D. Milnacipran

2074 Monoamine oxidase (MAO) is the enzyme involved in ?

N Engl J Med 2005;353:1819-34

- A. Norepinephrine breakdown
- B. Epinephrine breakdown
- C. Dopamine breakdown
- D. All of the above

2075 Mirtazapine blocks ?

Harrison's 18th Ed. 3539, N Engl J Med 2005;353:1819-34

- A. Alpha2-adrenergic autoreceptors
- B. Serotonin 5-HT2A and 5-HT3 receptors
- C. Histamine H1 receptors

- D. All of the above

Mirtazapine is a TCA. It increases noradrenergic & serotonergic neurotransmission through a blockade of central α_2 -adrenergic receptors and postsynaptic $5HT_2$ and $5HT_3$ receptors. It is also strongly antihistaminic and may produce sedation.

2076 Which of the following are classified as mood stabilizers ?

Harrison's 18th Ed. 3540 Table 391-11, N Engl J Med 2005;353:1819-34

- A. Lithium
- B. Lamotrigine
- C. Divalproex
- D. All of the above

Mood Stabilizers include Lithium, Valproic Acid, Carbamazepine/Oxcarbazepine & Lamotrigine.

2077 ECT can be a first-line treatment for patients who have ?

N Engl J Med 2005;353:1819-34

- A. Severe major depressive disorder with psychotic features
- B. Psychomotor retardation
- C. Medication resistance
- D. All of the above

2078 Depressive symptoms can be caused by which of the following group of drugs ?

Harrison's 18th Ed. 3536

- A. Antihypertensive drugs
- B. Anticholesterolemic drugs
- C. Antiarrhythmic drugs
- D. All of the above

2079 Iatrogenic depression can be caused by which of the following group of drugs ?

Harrison's 18th Ed. 3536

- A. Glucocorticoids
- B. Antimicrobials
- C. Systemic analgesics
- D. All of the above

Iatrogenic depression can be induced by antihypertensives, anticholesterolemics, antiarrhythmics, glucocorticoids, antimicrobials, systemic analgesics, antiparkinsonian medications, and anticonvulsants.

2080 Which amino acid is the precursor of serotonin ?

Harrison's 16th Ed. 2554

- A. Tryptophan
- B. Leucine
- C. Isoleucine
- D. Arginine

2081 Which Tricyclic antidepressant carries the greatest risk in overdose ?

Harrison's 18th Ed. 3538

- A. Desipramine
- B. Imipramine
- C. Nortriptyline
- D. Amitriptyline

Overdoses of tricyclic agents can be lethal, with desipramine carrying the greatest risk. TCAs are contraindicated in patients with serious cardiovascular risk factors.

2082 Akathisia refers to ?

Harrison's 18th Ed. 3538

- A. Phobias for high pitched sounds
- B. Inner sense of restlessness and anxiety
- C. Obsession for cleanliness
- D. Transient blindness

Akathisia refers to an inner sense of restlessness and anxiety.

2083 SSRI induced sexual dysfunction can be ameliorated by ?

Harrison's 18th Ed. 3538

- A. Amantadine
- B. Bethanechol
- C. Buspirone
- D. All of the above

All SSRIs impair sexual function. Sexual dysfunction can be ameliorated by lowering dose, weekend drug holidays, or by treatment with amantadine, bethanechol, buspirone, or bupropion.

2084 Which of the following about Mirtazapine is false ?

Harrison's 18th Ed. 3539

- A. Tetracyclic antidepressant
- B. Increases noradrenergic & serotonergic neurotransmission
- C. Strongly antihistaminic
- D. Does not inhibit cytochrome P450 enzymes

2085 Which of the following SSRIs does not inhibit one or more cytochrome P450 enzymes ?

Harrison's 18th Ed. 3539

- A. Sertraline
- B. Citalopram
- C. Fluoxetine
- D. Paroxetine

With the exception of citalopram & escitalopram, each of the SSRIs inhibits one or more cytochrome P450 enzymes.

2086 Mania in its pure form is associated with ?

Harrison's 18th Ed. 3539

- A. Increased psychomotor activity
- B. Impulsivity and impairment in judgment
- C. Decreased need for sleep
- D. All of the above

Bipolar disorder patients suffer from recurrent attacks of mania, which in its pure form is associated with increased psychomotor activity, excessive social extroversion, decreased need for sleep; impulsivity and impairment in judgment, and grandiose irritable mood.

2087 Drug for treatment of bipolar disorders include ?

Harrison's 18th Ed. 3540

- A. Lithium carbonate
- B. Sodium valproate
- C. Olanzapine
- D. All of the above

2088 Which of the following about lithium therapy is false ?

Harrison's 18th Ed. 3540

- A. Side effects include polyuria & weight gain
- B. Lithium exerts an antithyroid effect

- C. No prophylactic effect in prevention of recurrent mania
- D. Excreted mainly by kidneys

Lithium also has a prophylactic effect in prevention of recurrent mania and, to a lesser extent, in prevention of recurrent depression.

2089 Akinetic mutism can be caused by ?

Harrison's 16th Ed. 1625

- A. Damage of the medial thalamic nuclei
- B. Damage of the frontal lobes
- C. Hydrocephalus
- D. All of the above

2090 Mild form of akinetic mutism is called ?

Harrison's 16th Ed. 1625

- A. Agnosia
- B. Abulia
- C. Akathesia
- D. None of the above

2091 Hypomobile and mute syndrome associated with a major psychosis is ?

Harrison's 16th Ed. 1625

- A. Catatonia
- B. Abulia
- C. Agnosia
- D. Akathesia

2092 Beclouded dementia refers to ?

Harrison's 16th Ed. 1625

- A. Acute medical problem, or a poorly tolerated medication supervenes in a mildly demented patient
- B. Transient confusion & drowsiness with febrile infection
- C. Awake but unresponsive state
- D. Awake but cannot produce speech

2093 MASA syndrome includes all except ?

Harrison's 15th Ed. Chapter 359

- A. Mental retardation
- B. Aphasia
- C. Syncope
- D. Adducted thumbs

392 - Alcohol and Alcoholism

2094 At low doses, alcohol can have which of the following beneficial effects ?

Harrison's 17th Ed. 2724

- A. Decreased rates of myocardial infarction
- B. Decreased rates of stroke
- C. Decreased rates of gallstones
- D. All of the above

Beneficial effects of low doses of alcohol are decreased rates of myocardial infarction, stroke, gallstones and vascular & Alzheimer's dementias.

2095 The major site of absorption of alcohol is ?

Harrison's 17th Ed. 2724

- A. Mouth and esophagus
- B. Stomach
- C. Proximal small intestine
- D. Large bowel

Alcohol is absorbed from mucous membranes of mouth & esophagus in small amounts, from stomach & large bowel in modest amounts. The major site of absorption is the proximal portion of small intestine.

2096 Alcohol is excreted directly through which of the following ?

Harrison's 18th Ed. 3546

- A. Lungs
- B. Urine
- C. Sweat
- D. All of the above

Between 2% and 10% of ethanol is excreted directly through lungs, urine, or sweat. Greater part is metabolized to acetaldehyde in liver.

2097 In liver, which of the following is responsible for metabolism of alcohol ?

Harrison's 18th Ed. 3546 Figure 392-1

- A. Alcohol dehydrogenase (ADH)
- B. Aldehyde dehydrogenase (ALDH)
- C. Microsomal ethanol-oxidizing system (MEOS)
- D. All of the above

Two pathways operate to metabolise alcohol in body. First pathway (~80%) occurs in cell cytosol where alcohol dehydrogenase (ADH) produces acetaldehyde, which is then rapidly destroyed by aldehyde dehydrogenase (ALDH) in cytosol and mitochondria to either Acetyl CoA or Acetate. Second pathway (~20%) is microsomal ethanol-oxidizing system or MEOS in smooth endoplasmic reticulum.

2098 Alcohol is devoid of which of the following ?

Harrison's 18th Ed. 3546

- A. Minerals
- B. Proteins
- C. Vitamins
- D. All of the above

Alcohol is devoid of nutrients such as minerals, proteins and vitamins.

2099 Alcohol affects levels of which of the following vitamins ?

Harrison's 18th Ed. 3546

- A. Vitamin A
- B. Pyridoxine (B_6)
- C. Nicotinic acid (niacin, B_3)
- D. All of the above

Alcohol produces modest effects on folate (folacin or folic acid), pyridoxine (B_6), thiamine (B_1), nicotinic acid (niacin, B_3) and vitamin A levels.

2100 Which of the following is false about alcohol ketoacidosis ?

Harrison's 18th Ed. 3546

- A. Large anion gap
- B. Increase in serum lactate
- C. Increase in β -hydroxybutyrate / lactate ratio
- D. None of the above

Alcohol ketoacidosis patients show an increase in serum ketones with mild increase in glucose but a large anion gap, a mild - moderate increase in serum lactate & increased β -hydroxybutyrate/lactate ratio.

2101 One typical alcohol drink produces blood levels of ?*Harrison's 18th Ed. 3546*

- A. ~ 10 mg/dL
- B. ~ 20 mg/dL
- C. ~ 30 mg/dL
- D. ~ 40 mg/dL

*Blood values of ~20 mg/dL result from ingestion of one typical drink.***2102 "Legal intoxication" in USA requires a blood alcohol concentration of at least ?***Harrison's 18th Ed. 3547*

- A. 40 mg/dL
- B. 80 mg/dL
- C. 120 mg/dL
- D. 160 mg/dL

*"Legal intoxication" in USA requires a blood alcohol concentration of at least 80 - 100 mg/dL.***2103 Intoxicating effect of alcohol is due to its action on ?***Harrison's 18th Ed. 3546*

- A. Neurotransmitters
- B. Receptors
- C. Transporters
- D. All of the above

*Intoxicating effect of alcohol is due to its action on several neurotransmitters, receptors & transporters.***2104 Alcohol affects which of the following neurochemical systems in the brain ?***N Engl J Med 2008;359:715-21*

- A. γ -aminobutyric acid (GABA)
- B. Glutamate
- C. Dopamine
- D. All of the above

*Neurochemical systems in brain influenced by alcohol are γ -aminobutyric acid (GABA), glutamate, dopamine, and opiate systems. GABA and glutamate are involved with alcohol stimulation, sedation, intoxication & many symptoms of alcohol withdrawal. Dopamine & opiate systems are involved with reinforcement, reward, some aspects of craving, sustained use of alcohol and potential relapse after prolonged abstinence in dependent person.***2105 Which of the following is related to alcohol-use disorders ?***N Engl J Med 2008;359:715-21*

- A. Nucleus basalis of Meynert
- B. Nucleus accumbens
- C. Caudate nucleus
- D. All of the above

*Ethanol inhibits inhibitory neurons in midbrain ventral tegmental area (VTA) leading to increased dopamine release in nucleus accumbens. Blockade of dopamine in nucleus accumbens can terminate rewarding effects of addictive drugs.***2106 Which of the following is false about actions of alcohol ?***Harrison's 18th Ed. 3546*

- A. Alcohol inhibits GABA_A receptors
- B. Alcohol inhibits NMDA receptors
- C. Inhibition of uptake of adenosine
- D. Increases serotonin actions

*Alcohol acutely enhances actions at γ -aminobutyric acid A (GABA_A) receptors and inhibits N-methyl-D-aspartate (NMDA) receptors.***2107 Compensatory mechanism in alcohol tolerance is ?***Harrison's 18th Ed. 3547*

- A. Metabolic or pharmacokinetic tolerance
- B. Cellular or pharmacodynamic tolerance
- C. Behavioral tolerance
- D. All of the above

*Alcohol tolerance involves compensatory mechanisms like metabolic or pharmacokinetic tolerance, cellular or pharmacodynamic tolerance and behavioral tolerance.***2108 Which of the following occurs in chronic alcoholism ?***Harrison's 18th Ed. 3547*

- A. Episode of temporary anterograde amnesia
- B. Deficiency in REM sleep
- C. Exacerbation of sleep apnea
- D. All of the above

*Alcoholics may experience episodes of temporary anterograde amnesia, reduced rapid eye movement (REM) and deep sleep, exacerbated sleep apnea & prominent and disturbing dreams.***2109 Which of the following are features of Wernicke's syndrome ?***Harrison's 18th Ed. 3547*

- A. Ophthalmoparesis
- B. Ataxia
- C. Encephalopathy
- D. All of the above

2110 Korsakoff's syndrome in alcoholics is due to the deficiency of ?*Harrison's 18th Ed. 3547*

- A. Methionine
- B. Thiamine
- C. Tryptophan
- D. All of the above

2111 Korsakoff's syndrome in alcoholics is predisposed by the deficiency of ?*Harrison's 18th Ed. 3547*

- A. Acetylketolase deficiency
- B. Paraketolase deficiency
- C. Transketolase deficiency
- D. Semiketolase deficiency

*Wernicke's syndrome refers to ophthalmoparesis, ataxia & encephalopathy. Korsakoff's syndrome includes retrograde & anterograde amnesia. Both are due to thiamine deficiency, especially in those with transketolase deficiency.***2112 Alcohol can cause all except which of the following ?***Harrison's 18th Ed. 3548*

- A. Impairs gluconeogenesis in liver
- B. Increases lactate production
- C. Increases oxidation of fatty acids
- D. Increases fat accumulation in liver cells

*Alcohol impairs gluconeogenesis in liver, increases lactate production and decreases oxidation of fatty acids leading to increased fat accumulation in liver cells. Repeated exposure to ethanol leads to alcohol-induced hepatitis, perivenular sclerosis and cirrhosis.***2113 Alcohol increases the risk of which of the following cancer ?***Harrison's 18th Ed. 3548*

- A. Breast cancer in women
- B. Oral and esophageal cancer

- C. Rectal cancer
- D. All of the above

Alcohol consumption increases risk of breast cancer (in women), oral, esophageal and rectal cancers.

2114 “Holiday heart” refers to ?

Harrison's 18th Ed. 3548

- A. Dilation of all heart chambers in chronic alcoholics
- B. Paroxysmal tachycardia after a drinking binge in individuals without heart disease
- C. Finding of >25 % decrease in heart rate at times of leisure
- D. Finding of >10 % decrease in SBP at times of leisure

Atrial or ventricular arrhythmias, especially paroxysmal tachycardia, can occur after a drinking binge in individuals with no other evidence of heart disease (holiday heart syndrome).

2115 Features of ‘Fetal alcohol syndrome’ include all except ?

Harrison's 18th Ed. 3549

- A. Epicanthal eye folds
- B. Poorly formed concha
- C. Small teeth with faulty enamel
- D. Microglossia

2116 Features of ‘Fetal alcohol syndrome’ include all except ?

Harrison's 18th Ed. 3549

- A. Atrial or ventricular septal defect
- B. Aberrant palmar crease
- C. Polydactyly
- D. Microcephaly with mental retardation

Fetal alcohol syndrome can include facial changes with epicanthal eye folds, poorly formed ear concha, small teeth with faulty enamel, cardiac atrial or ventricular septal defects, aberrant palmar crease & limitation in joint movement, and microcephaly with mental retardation.

2117 Polydactyly is a feature of ?

Harrison's 16th Ed. 1382

- A. Ellis-van Creveld syndrome
- B. Laurence Moon Biedl Bardet syndrome
- C. Trisomy 13 (D)
- D. All of the above

2118 Which of the following is a feature of fetal alcohol spectrum disorder (FASD) ?

Harrison's 18th Ed. 3549

- A. Low birth weight
- B. Lower IQ
- C. Hyperactive behavior
- D. All of the above

Features of fetal alcohol spectrum disorder (FASD) include low birth weight, a lower IQ, hyperactive behavior, and some modest cognitive deficits.

2119 Hormonal changes during heavy drinking include ?

Harrison's 18th Ed. 3549

- A. Increase in cortisol levels
- B. Inhibition of vasopressin secretion
- C. Decrease in serum triiodothyronine (T₃)
- D. All of the above

Hormonal changes during heavy drinking include an increase in cortisol levels, inhibition of

vasopressin secretion at rising blood alcohol concentrations & enhanced secretion at falling blood alcohol concentrations, reversible decrease in serum T₄ and T₃.

2120 Blood tests useful in identifying individuals consuming six or more standard drinks per day include ?

Harrison's 18th Ed. 3550

- A. γ-glutamyl transferase (GGT)
- B. Carbohydrate-deficient transferrin (CDT)
- C. Serum uric acid (>7 mg/dL)
- D. All of the above

Laboratory tests that are likely to be abnormal in persons with regular alcohol consumption of 6 to 8 or more drinks per day are γ-glutamyl transferase (GGT) (>35 U), carbohydrate-deficient transferrin (CDT) (>20 U/L), high-normal MCVs (>91 μm³) and serum uric acid (>7 mg/dL).

2121 Alcohol withdrawal symptoms peak in intensity on day ?

Harrison's 18th Ed. 3551

- A. 1 - 2
- B. 2 - 3
- C. 3 - 4
- D. 4 - 5

Alcohol withdrawal symptoms begin within 5 - 10 hours of decreasing ethanol intake, peak in intensity on day 2 or 3, and improve by day 4 or 5.

2122 Delirium in delirium tremens includes all except ?

Harrison's 18th Ed. 3551

- A. Mental confusion
- B. Agitation
- C. Hallucinations
- D. Fluctuating levels of consciousness

Delirium tremens (DTs) is a state of intense acute alcohol withdrawal. It includes delirium (mental confusion, agitation, and fluctuating levels of consciousness) associated with a tremor & autonomic overactivity (tachycardia, hypertension, and tachypnoea).

2123 Medication helpful in alcoholic rehabilitation include ?

Harrison's 18th Ed. 3552

- A. Naltrexone
- B. Acamprosate
- C. Disulfiram
- D. All of the above

Naltrexone is a mu opioid receptor antagonist given in doses of 50 - 150 mg/day. It decreases activity in dopamine-rich ventral tegmental reward system. Acamprosate in doses of 2 gm/day inhibits the actions of NMDA receptors. Disulfiram (250 mg/day) is an ALDH inhibitor. It produces an unpleasant reaction in presence of alcohol due to rapidly rising blood levels of acetaldehyde. Other drugs under investigation are selective 5-HT₃ receptor antagonist ondansetron, anticonvulsant topiramate, nalmafene (opioid receptor antagonist) and cannabinol receptor antagonist ramonibant.

393 - Opioid Drug Abuse and Dependence

2124 The pharmacological term for codeine is ?

Harrison's 17th Ed. 2729

- A. 1-methoxymorphine
- B. 2-methoxymorphine
- C. 3-methoxymorphine
- D. 4-methoxymorphine

Codeine chemically is 3-methoxymorphine.

2125 Morphine & codeine are derived from the juice of ?*Harrison's 17th Ed. 2729*

- A. Papaver somnicuram
- B. Papaver somnitrium
- C. Papaver somnifitide
- D. Papaver somniferum

*Morphine & codeine are derived from the juice of poppy Papaver somniferum.***2126 The semisynthetic drugs produced from morphine or thebaine molecules include all except ?***Harrison's 17th Ed. 2729*

- A. Hydromorphone
- B. Diacetylmorphine (heroin)
- C. Oxycodone
- D. Meperidine

2127 The purely synthetic opioids include all except ?*Harrison's 17th Ed. 2729*

- A. Meperidine
- B. Propoxyphene
- C. Hydromorphone
- D. Tramadol

*Semisynthetic drugs produced from morphine or thebaine molecules include hydromorphone, diacetylmorphine (heroin) and oxycodone. Purely synthetic opioids include meperidine, propoxyphene, diphenoxylate, fentanyl, buprenorphine, tramadol, methadone, and pentazocine.***2128 Endogenous opioid peptide includes ?***Harrison's 17th Ed. 2729*

- A. Enkephalins
- B. Endorphins
- C. Dynorphins
- D. All of the above

*Body's endogenous opioid peptides are enkephalins, endorphins & dynorphins and are natural ligands for opioid receptors.***2129 Pure opiate antagonists are all of the following except ?***Harrison's 17th Ed. 2730*

- A. Naloxone
- B. Nalorphine
- C. Nalmefene
- D. Naltrexone

*Pure opiate antagonists include naloxone, nalmefene and naltrexone. Nalorphine, levallorphan, cyclazocine, butorphanol, buprenorphine & pentazocine have mixed agonist & antagonist properties.***2130 Which of the following is not an 'Opioid Receptor' ?***Harrison's 17th Ed. 2730*

- A. Mu
- B. Kappa
- C. Delta
- D. Gamma

*Opioid Receptor types include μ , κ and δ . Nociceptin or orphanin is another receptor.***2131 The least intense effects of opioids occur after ?***Harrison's 17th Ed. 2730*

- A. Intravenous administration
- B. Smoking
- C. Inhaling the vapor
- D. Oral consumption

*Most rapid & pronounced effects of opioids occur through IV administration. Little less efficient absorption is after smoking or inhaling the vapor ("chasing the dragon"). Slowest onset & least intense effects occur after oral consumption.***2132 Euphoria & rewarding effects of opioids are due to stimulation of ?***Harrison's 17th Ed. 2730*

- A. γ -aminobutyric acid (GABA) pathway
- B. Glutamate pathway
- C. Dopaminergic pathway
- D. All of the above

*Euphoria and rewarding effects of opioids are due to stimulation of dopaminergic pathways originating in midbrain & terminating in nucleus accumbens.***2133 Acute opioid administration causes all of the following except ?***Harrison's 17th Ed. 2730*

- A. Inhibits release of corticotropin-releasing factor (CRF)
- B. Inhibits release of luteinizing hormone
- C. Decreases release of thyrotropin
- D. Decreases release of prolactin

*Acute opioid administration inhibits release of corticotropin-releasing factor (CRF), luteinizing hormone & thyrotropin. It increases prolactin levels.***2134 Which of the following is associated with pes cavus ?**

- A. CMT1x
- B. Friedreich's Ataxia
- C. Nemaline Myopathy
- D. All of the above

Pes cavus is associated with CMT1x, Friedreich's Ataxia, Nemaline Myopathy, Central Core Disease and Plantar Fasciitis.

ANSWERS NEUROLOGY

1 B	46 D	91 B	136 D	181 B	226 D
2 D	47 D	92 D	137 D	182 A	227 B
3 B	48 B	93 B	138 B	183 B	228 D
4 D	49 A	94 A	139 D	184 A	229 C
5 B	50 D	95 B	140 D	185 B	230 D
6 D	51 D	96 D	141 B	186 A	231 A
7 A	52 C	97 A	142 B	187 B	232 A
8 B	53 C	98 B	143 D	188 D	233 C
9 D	54 B	99 D	144 C	189 D	234 B
10 D	55 A	100 D	145 C	190 A	235 D
11 D	56 C	101 C	146 D	191 C	236 C
12 D	57 D	102 D	147 C	192 D	237 D
13 D	58 A	103 A	148 D	193 C	238 B
14 D	59 D	104 D	149 B	194 B	239 C
15 D	60 B	105 C	150 C	195 B	240 B
16 A	61 D	106 D	151 D	196 D	241 D
17 C	62 D	107 D	152 D	197 C	242 D
18 C	63 D	108 C	153 C	198 A	243 C
19 A	64 A	109 B	154 C	199 B	244 D
20 D	65 D	110 D	155 C	200 A	245 C
21 D	66 C	111 A	156 C	201 B	246 D
22 B	67 B	112 D	157 D	202 C	247 C
23 D	68 A	113 C	158 C	203 D	248 B
24 D	69 B	114 D	159 C	204 D	249 D
25 D	70 C	115 D	160 B	205 A	250 C
26 D	71 C	116 C	161 B	206 B	251 A
27 D	72 A	117 B	162 D	207 C	252 D
28 C	73 C	118 C	163 D	208 D	253 C
29 C	74 B	119 B	164 D	209 B	254 D
30 A	75 D	120 B	165 D	210 C	255 C
31 C	76 B	121 B	166 A	211 A	256 A
32 B	77 D	122 A	167 D	212 A	257 C
33 D	78 D	123 C	168 B	213 B	258 B
34 A	79 C	124 D	169 D	214 D	259 D
35 D	80 B	125 C	170 A	215 D	260 D
36 A	81 A	126 D	171 B	216 D	261 D
37 A	82 D	127 B	172 A	217 D	262 D
38 B	83 C	128 B	173 C	218 D	263 C
39 D	84 C	129 B	174 D	219 B	264 B
40 B	85 D	130 C	175 A	220 D	265 B
41 B	86 A	131 B	176 A	221 C	266 D
42 A	87 B	132 C	177 B	222 D	267 A
43 C	88 C	133 A	178 C	223 D	268 A
44 D	89 B	134 D	179 D	224 B	269 A
45 D	90 C	135 D	180 D	225 D	270 C

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271 A	316 D	361 D	406 B	451 C	496 D
272 D	317 B	362 D	407 A	452 D	497 C
273 C	318 C	363 C	408 A	453 D	498 D
274 C	319 D	364 A	409 C	454 D	499 C
275 A	320 D	365 D	410 D	455 A	500 B
276 D	321 B	366 D	411 B	456 A	501 B
277 C	322 A	367 D	412 C	457 D	502 D
278 A	323 D	368 A	413 D	458 A	503 D
279 B	324 D	369 D	414 A	459 A	504 C
280 C	325 D	370 D	415 B	460 C	505 C
281 C	326 D	371 B	416 A	461 D	506 B
282 D	327 A	372 A	417 B	462 B	507 D
283 B	328 B	373 B	418 C	463 A	508 C
284 D	329 A	374 D	419 A	464 D	509 D
285 C	330 D	375 A	420 A	465 D	510 A
286 D	331 A	376 A	421 C	466 A	511 D
287 A	332 D	377 A	422 C	467 A	512 C
288 D	333 C	378 D	423 D	468 B	513 A
289 A	334 C	379 A	424 C	469 B	514 A
290 D	335 D	380 A	425 C	470 B	515 D
291 B	336 D	381 D	426 C	471 D	516 D
292 D	337 C	382 D	427 C	472 D	517 B
293 A	338 D	383 A	428 D	473 D	518 C
294 C	339 B	384 C	429 B	474 B	519 A
295 B	340 D	385 D	430 A	475 B	520 A
296 B	341 D	386 C	431 B	476 D	521 B
297 D	342 D	387 D	432 A	477 B	522 B
298 A	343 D	388 D	433 A	478 D	523 C
299 D	344 D	389 B	434 D	479 C	524 D
300 A	345 D	390 D	435 B	480 C	525 A
301 C	346 A	391 A	436 A	481 C	526 D
302 B	347 A	392 A	437 D	482 A	527 B
303 A	348 C	393 B	438 A	483 C	528 C
304 A	349 D	394 B	439 B	484 C	529 B
305 A	350 D	395 B	440 C	485 A	530 C
306 A	351 B	396 D	441 A	486 C	531 D
307 A	352 A	397 B	442 C	487 D	532 D
308 C	353 A	398 A	443 C	488 B	533 B
309 D	354 C	399 D	444 B	489 D	534 D
310 A	355 C	400 C	445 A	490 C	535 C
311 D	356 D	401 A	446 D	491 D	536 C
312 A	357 B	402 D	447 D	492 B	537 C
313 C	358 A	403 C	448 C	493 C	538 B
314 B	359 A	404 B	449 B	494 B	539 D
315 D	360 A	405 C	450 C	495 C	540 A

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541 B	586 B	631 B	676 C	721 D	766 C
542 B	587 D	632 C	677 B	722 D	767 A
543 D	588 D	633 C	678 D	723 D	768 C
544 D	589 C	634 A	679 D	724 C	769 A
545 D	590 C	635 D	680 C	725 B	770 D
546 C	591 C	636 C	681 D	726 D	771 C
547 C	592 D	637 D	682 A	727 D	772 D
548 D	593 A	638 C	683 D	728 D	773 D
549 D	594 D	639 B	684 A	729 D	774 C
550 B	595 D	640 D	685 C	730 D	775 D
551 D	596 D	641 D	686 C	731 C	776 D
552 C	597 A	642 A	687 D	732 A	777 C
553 C	598 C	643 B	688 B	733 A	778 C
554 B	599 B	644 D	689 D	734 B	779 D
555 D	600 D	645 C	690 D	735 D	780 C
556 D	601 D	646 D	691 B	736 D	781 A
557 C	602 D	647 D	692 D	737 A	782 D
558 C	603 A	648 A	693 D	738 C	783 D
559 C	604 A	649 D	694 D	739 D	784 D
560 C	605 D	650 B	695 D	740 C	785 A
561 D	606 D	651 A	696 C	741 D	786 D
562 D	607 A	652 D	697 B	742 D	787 A
563 D	608 B	653 D	698 D	743 D	788 B
564 A	609 B	654 C	699 A	744 D	789 D
565 D	610 D	655 A	700 D	745 A	790 A
566 A	611 A	656 C	701 D	746 D	791 B
567 C	612 C	657 D	702 B	747 D	792 C
568 C	613 D	658 C	703 B	748 D	793 C
569 B	614 C	659 C	704 B	749 D	794 C
570 D	615 D	660 C	705 B	750 A	795 C
571 A	616 D	661 D	706 A	751 A	796 D
572 D	617 D	662 D	707 D	752 D	797 D
573 C	618 D	663 D	708 C	753 D	798 B
574 B	619 D	664 D	709 A	754 D	799 A
575 D	620 D	665 D	710 A	755 D	800 B
576 D	621 D	666 A	711 B	756 C	801 B
577 A	622 A	667 C	712 D	757 D	802 A
578 C	623 C	668 D	713 D	758 D	803 C
579 A	624 D	669 D	714 A	759 C	804 C
580 D	625 D	670 D	715 B	760 A	805 B
581 B	626 A	671 C	716 C	761 D	806 D
582 B	627 B	672 D	717 A	762 B	807 D
583 C	628 B	673 D	718 B	763 C	808 C
584 C	629 D	674 B	719 B	764 D	809 B
585 A	630 C	675 C	720 D	765 D	810 D

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811 A	856 B	901 C	946 D	991 D	1036 D
812 D	857 C	902 C	947 D	992 D	1037 A
813 D	858 D	903 D	948 D	993 C	1038 D
814 B	859 C	904 C	949 D	994 B	1039 C
815 C	860 D	905 C	950 D	995 D	1040 C
816 A	861 D	906 B	951 D	996 D	1041 C
817 C	862 D	907 B	952 D	997 D	1042 B
818 B	863 D	908 B	953 D	998 B	1043 C
819 D	864 A	909 B	954 D	999 D	1044 D
820 B	865 C	910 B	955 A	1000 A	1045 A
821 D	866 B	911 B	956 D	1001 B	1046 A
822 B	867 C	912 A	957 C	1002 C	1047 A
823 B	868 D	913 D	958 D	1003 B	1048 B
824 B	869 C	914 B	959 D	1004 A	1049 D
825 A	870 B	915 A	960 C	1005 B	1050 D
826 B	871 D	916 B	961 D	1006 C	1051 A
827 C	872 A	917 C	962 D	1007 B	1052 A
828 D	873 D	918 A	963 B	1008 D	1053 C
829 B	874 A	919 C	964 D	1009 D	1054 D
830 D	875 D	920 B	965 D	1010 A	1055 D
831 C	876 C	921 D	966 D	1011 D	1056 A
832 D	877 B	922 A	967 B	1012 D	1057 D
833 A	878 D	923 C	968 D	1013 C	1058 D
834 D	879 C	924 B	969 C	1014 B	1059 D
835 B	880 C	925 C	970 D	1015 D	1060 D
836 C	881 A	926 D	971 A	1016 D	1061 D
837 D	882 C	927 B	972 A	1017 B	1062 D
838 C	883 D	928 C	973 D	1018 C	1063 C
839 D	884 D	929 B	974 D	1019 D	1064 D
840 B	885 B	930 D	975 A	1020 D	1065 B
841 A	886 D	931 C	976 C	1021 B	1066 B
842 B	887 D	932 B	977 D	1022 C	1067 A
843 D	888 D	933 D	978 C	1023 C	1068 D
844 A	889 B	934 D	979 D	1024 D	1069 A
845 B	890 B	935 B	980 D	1025 D	1070 D
846 D	891 A	936 B	981 C	1026 C	1071 A
847 D	892 D	937 B	982 C	1027 C	1072 C
848 C	893 D	938 B	983 D	1028 B	1073 A
849 D	894 C	939 A	984 D	1029 C	1074 D
850 B	895 A	940 D	985 D	1030 D	1075 D
851 D	896 D	941 C	986 D	1031 D	1076 D
852 D	897 D	942 C	987 D	1032 D	1077 D
853 C	898 C	943 C	988 A	1033 A	1078 A
854 D	899 A	944 A	989 C	1034 D	1079 D
855 D	900 A	945 D	990 D	1035 D	1080 B

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1081 A	1126 A	1171 C	1216 C	1261 D	1306 A
1082 B	1127 B	1172 C	1217 B	1262 D	1307 D
1083 D	1128 D	1173 A	1218 C	1263 D	1308 D
1084 B	1129 A	1174 C	1219 C	1264 A	1309 A
1085 B	1130 D	1175 C	1220 B	1265 B	1310 A
1086 B	1131 C	1176 D	1221 C	1266 D	1311 B
1087 B	1132 D	1177 D	1222 B	1267 D	1312 A
1088 D	1133 D	1178 C	1223 D	1268 A	1313 B
1089 D	1134 A	1179 C	1224 D	1269 D	1314 B
1090 A	1135 C	1180 A	1225 D	1270 C	1315 A
1091 D	1136 D	1181 D	1226 D	1271 D	1316 D
1092 D	1137 D	1182 D	1227 D	1272 D	1317 D
1093 D	1138 D	1183 B	1228 A	1273 D	1318 C
1094 C	1139 D	1184 D	1229 A	1274 D	1319 D
1095 B	1140 B	1185 D	1230 D	1275 D	1320 D
1096 B	1141 C	1186 C	1231 D	1276 D	1321 D
1097 A	1142 C	1187 D	1232 D	1277 D	1322 D
1098 D	1143 C	1188 B	1233 A	1278 D	1323 C
1099 B	1144 B	1189 D	1234 D	1279 D	1324 D
1100 B	1145 D	1190 D	1235 D	1280 D	1325 C
1101 D	1146 D	1191 A	1236 D	1281 D	1326 A
1102 D	1147 D	1192 D	1237 D	1282 B	1327 D
1103 B	1148 D	1193 B	1238 B	1283 B	1328 D
1104 B	1149 D	1194 C	1239 D	1284 C	1329 A
1105 A	1150 B	1195 B	1240 D	1285 A	1330 A
1106 C	1151 D	1196 B	1241 B	1286 B	1331 D
1107 D	1152 D	1197 C	1242 B	1287 C	1332 B
1108 D	1153 D	1198 D	1243 D	1288 D	1333 C
1109 A	1154 A	1199 D	1244 C	1289 A	1334 D
1110 B	1155 B	1200 A	1245 C	1290 B	1335 A
1111 C	1156 C	1201 C	1246 C	1291 C	1336 D
1112 A	1157 D	1202 A	1247 D	1292 D	1337 C
1113 B	1158 D	1203 B	1248 C	1293 A	1338 C
1114 D	1159 D	1204 B	1249 C	1294 B	1339 B
1115 A	1160 A	1205 D	1250 D	1295 C	1340 A
1116 C	1161 A	1206 D	1251 D	1296 A	1341 A
1117 A	1162 B	1207 D	1252 B	1297 B	1342 C
1118 D	1163 D	1208 D	1253 D	1298 C	1343 A
1119 D	1164 D	1209 B	1254 D	1299 D	1344 C
1120 C	1165 D	1210 A	1255 C	1300 A	1345 D
1121 A	1166 D	1211 B	1256 C	1301 A	1346 A
1122 D	1167 D	1212 D	1257 C	1302 D	1347 B
1123 A	1168 D	1213 C	1258 B	1303 D	1348 D
1124 C	1169 C	1214 A	1259 B	1304 C	1349 B
1125 A	1170 D	1215 C	1260 D	1305 A	1350 C

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1351 C	1396 A	1441 C	1486 C	1531 A	1576 B
1352 C	1397 A	1442 D	1487 D	1532 A	1577 D
1353 D	1398 B	1443 A	1488 D	1533 D	1578 A
1354 C	1399 C	1444 B	1489 D	1534 A	1579 A
1355 A	1400 D	1445 D	1490 A	1535 A	1580 D
1356 B	1401 D	1446 D	1491 B	1536 A	1581 D
1357 B	1402 B	1447 A	1492 C	1537 C	1582 D
1358 D	1403 D	1448 C	1493 D	1538 D	1583 C
1359 D	1404 B	1449 D	1494 B	1539 D	1584 D
1360 D	1405 A	1450 D	1495 C	1540 B	1585 B
1361 D	1406 A	1451 A	1496 B	1541 C	1586 D
1362 D	1407 D	1452 D	1497 B	1542 B	1587 C
1363 D	1408 C	1453 A	1498 D	1543 D	1588 B
1364 C	1409 D	1454 C	1499 D	1544 D	1589 B
1365 D	1410 A	1455 B	1500 D	1545 D	1590 D
1366 B	1411 D	1456 D	1501 C	1546 C	1591 D
1367 D	1412 D	1457 D	1502 C	1547 C	1592 C
1368 C	1413 D	1458 C	1503 D	1548 C	1593 B
1369 C	1414 A	1459 D	1504 D	1549 B	1594 D
1370 B	1415 D	1460 D	1505 A	1550 D	1595 C
1371 B	1416 C	1461 B	1506 D	1551 A	1596 D
1372 B	1417 D	1462 C	1507 D	1552 D	1597 D
1373 A	1418 D	1463 C	1508 A	1553 C	1598 D
1374 C	1419 C	1464 D	1509 D	1554 D	1599 D
1375 B	1420 A	1465 C	1510 C	1555 B	1600 D
1376 B	1421 D	1466 C	1511 C	1556 D	1601 D
1377 B	1422 B	1467 C	1512 A	1557 D	1602 C
1378 A	1423 A	1468 C	1513 C	1558 A	1603 D
1379 A	1424 D	1469 D	1514 D	1559 D	1604 C
1380 A	1425 B	1470 D	1515 D	1560 D	1605 D
1381 A	1426 B	1471 D	1516 C	1561 D	1606 A
1382 A	1427 B	1472 D	1517 B	1562 C	1607 B
1383 B	1428 D	1473 C	1518 D	1563 D	1608 D
1384 B	1429 D	1474 A	1519 A	1564 D	1609 C
1385 D	1430 C	1475 B	1520 D	1565 A	1610 D
1386 A	1431 C	1476 D	1521 D	1566 A	1611 A
1387 D	1432 B	1477 B	1522 B	1567 D	1612 D
1388 D	1433 B	1478 C	1523 B	1568 B	1613 A
1389 A	1434 D	1479 D	1524 A	1569 C	1614 D
1390 A	1435 D	1480 B	1525 C	1570 B	1615 D
1391 D	1436 C	1481 D	1526 D	1571 B	1616 B
1392 D	1437 D	1482 D	1527 A	1572 D	1617 A
1393 C	1438 D	1483 D	1528 D	1573 C	1618 B
1394 D	1439 D	1484 D	1529 D	1574 D	1619 C
1395 A	1440 A	1485 A	1530 A	1575 B	1620 D

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1621 D	1666 D	1711 A	1756 A	1801 A	1846 D
1622 A	1667 C	1712 A	1757 D	1802 D	1847 C
1623 A	1668 D	1713 B	1758 A	1803 D	1848 C
1624 B	1669 D	1714 B	1759 D	1804 D	1849 D
1625 C	1670 D	1715 C	1760 B	1805 D	1850 D
1626 C	1671 B	1716 D	1761 D	1806 A	1851 B
1627 C	1672 D	1717 C	1762 C	1807 C	1852 C
1628 D	1673 C	1718 D	1763 D	1808 B	1853 A
1629 C	1674 B	1719 D	1764 B	1809 B	1854 A
1630 B	1675 B	1720 D	1765 C	1810 A	1855 C
1631 D	1676 B	1721 D	1766 D	1811 A	1856 B
1632 A	1677 D	1722 D	1767 D	1812 D	1857 B
1633 A	1678 A	1723 B	1768 D	1813 A	1858 D
1634 B	1679 B	1724 D	1769 D	1814 A	1859 D
1635 A	1680 D	1725 B	1770 A	1815 A	1860 D
1636 C	1681 A	1726 D	1771 D	1816 B	1861 C
1637 B	1682 A	1727 D	1772 D	1817 A	1862 A
1638 D	1683 B	1728 C	1773 D	1818 D	1863 B
1639 D	1684 D	1729 D	1774 D	1819 D	1864 A
1640 A	1685 D	1730 D	1775 B	1820 D	1865 D
1641 B	1686 A	1731 D	1776 A	1821 A	1866 A
1642 A	1687 D	1732 C	1777 D	1822 D	1867 D
1643 D	1688 B	1733 C	1778 D	1823 C	1868 D
1644 D	1689 D	1734 B	1779 A	1824 C	1869 C
1645 D	1690 D	1735 C	1780 C	1825 D	1870 A
1646 D	1691 D	1736 D	1781 C	1826 D	1871 D
1647 D	1692 D	1737 B	1782 A	1827 C	1872 D
1648 A	1693 C	1738 C	1783 A	1828 D	1873 D
1649 B	1694 B	1739 A	1784 D	1829 A	1874 D
1650 D	1695 D	1740 A	1785 D	1830 D	1875 A
1651 D	1696 A	1741 C	1786 A	1831 D	1876 D
1652 D	1697 D	1742 D	1787 A	1832 A	1877 D
1653 B	1698 B	1743 D	1788 C	1833 C	1878 C
1654 D	1699 D	1744 B	1789 C	1834 B	1879 A
1655 D	1700 B	1745 D	1790 B	1835 B	1880 D
1656 C	1701 D	1746 C	1791 D	1836 B	1881 D
1657 D	1702 C	1747 D	1792 B	1837 D	1882 B
1658 A	1703 D	1748 A	1793 C	1838 B	1883 A
1659 A	1704 D	1749 C	1794 B	1839 C	1884 B
1660 A	1705 B	1750 D	1795 C	1840 D	1885 C
1661 D	1706 D	1751 B	1796 B	1841 C	1886 A
1662 C	1707 A	1752 A	1797 D	1842 B	1887 D
1663 C	1708 B	1753 C	1798 B	1843 D	1888 D
1664 C	1709 D	1754 D	1799 D	1844 D	1889 A
1665 C	1710 B	1755 D	1800 D	1845 D	1890 C

ANSWERS NEUROLOGY

1891 D	1936 D	1981 B	2026 D	2071 D	2116 C
1892 D	1937 A	1982 A	2027 C	2072 D	2117 D
1893 C	1938 A	1983 D	2028 D	2073 A	2118 D
1894 C	1939 D	1984 B	2029 B	2074 A	2119 D
1895 B	1940 B	1985 D	2030 B	2075 D	2120 D
1896 D	1941 D	1986 D	2031 D	2076 D	2121 B
1897 D	1942 B	1987 B	2032 A	2077 D	2122 C
1898 D	1943 D	1988 D	2033 C	2078 D	2123 D
1899 D	1944 D	1989 A	2034 C	2079 D	2124 C
1900 D	1945 C	1990 A	2035 D	2080 A	2125 D
1901 A	1946 C	1991 D	2036 B	2081 A	2126 D
1902 D	1947 B	1992 A	2037 A	2082 D	2127 C
1903 A	1948 D	1993 A	2038 D	2083 D	2128 D
1904 D	1949 D	1994 A	2039 D	2084 D	2129 B
1905 B	1950 A	1995 B	2040 D	2085 B	2130 D
1906 D	1951 A	1996 B	2041 D	2086 D	2131 D
1907 D	1952 B	1997 C	2042 C	2087 D	2132 C
1908 B	1953 D	1998 B	2043 D	2088 C	2133 D
1909 B	1954 A	1999 B	2044 D	2089 D	2134 D
1910 A	1955 C	2000 B	2045 B	2090 B	
1911 A	1956 D	2001 B	2046 C	2091 A	
1912 B	1957 C	2002 B	2047 C	2092 A	
1913 A	1958 C	2003 A	2048 D	2093 C	
1914 A	1959 A	2004 D	2049 D	2094 D	
1915 D	1960 B	2005 C	2050 A	2095 C	
1916 C	1961 D	2006 B	2051 B	2096 D	
1917 B	1962 D	2007 A	2052 A	2097 D	
1918 D	1963 D	2008 A	2053 B	2098 D	
1919 D	1964 B	2009 D	2054 B	2099 D	
1920 D	1965 D	2010 C	2055 D	2100 D	
1921 D	1966 D	2011 A	2056 D	2101 B	
1922 B	1967 D	2012 B	2057 B	2102 B	
1923 B	1968 B	2013 A	2058 A	2103 D	
1924 D	1969 A	2014 C	2059 D	2104 D	
1925 A	1970 A	2015 C	2060 C	2105 B	
1926 D	1971 B	2016 C	2061 B	2106 A	
1927 A	1972 D	2017 A	2062 C	2107 D	
1928 B	1973 C	2018 B	2063 A	2108 D	
1929 D	1974 A	2019 D	2064 B	2109 D	
1930 B	1975 C	2020 B	2065 B	2110 B	
1931 C	1976 A	2021 B	2066 C	2111 C	
1932 D	1977 D	2022 D	2067 A	2112 C	
1933 D	1978 A	2023 D	2068 D	2113 D	
1934 D	1979 D	2024 C	2069 B	2114 B	
1935 D	1980 B	2025 A	2070 D	2115 D	

Genetics

1 Which of the following statements is false ?

Harrison's 16th Ed. 360

- A. Human genome contains ~ 30000 - 40000 genes
- B. Human DNA consist of ~3 billion base pairs (bp) of DNA per haploid genome
- C. All DNA encodes genes
- D. Short arm of chromosome is termed "p"

2 Which of the following statements is false ?

Harrison's 16th Ed. 362

- A. DNA is composed of adenine, thymidine, guanine & cytosine
- B. Adenine is paired to thymidine
- C. Guanine is paired to cytosine
- D. RNA is more stable than DNA

3 Which of the following is false about codons ?

Harrison's 16th Ed. 361

- A. Triplet of bases
- B. Specifies a particular amino acid
- C. There are more codons than amino acids
- D. None of the above

4 Resting state cells are in which phase ?

Harrison's 16th Ed. 361

- A. G₀
- B. G₁
- C. G₂
- D. G₃

5 Which phase in cell mitosis is called critical checkpoint ?

Harrison's 16th Ed. 361

- A. G₀
- B. G₁
- C. G₂
- D. G₃

6 Prader-Willi syndrome consists of all except ?

Harrison's 16th Ed. 362

- A. Obesity
- B. Short stature
- C. Deafness
- D. Hypogonadism

7 Albright hereditary osteodystrophy consists of ?

Harrison's 16th Ed. 362

- A. Resistance to parathyroid hormone
- B. Short stature
- C. Brachydactyly
- D. All of the above

8 Gene expression requires ?

Harrison's 16th Ed. 362

- A. mRNA processing

- B. Protein translation
- C. Posttranslational modifications
- D. All of the above

9 Portion of genes that are eventually spliced together to form mRNA are called ?

Harrison's 16th Ed. 362

- A. Exons
- B. Introns
- C. Cistron
- D. Recon

10 Spacing regions between the exons that are spliced out of precursor RNAs during RNA processing are called ?

Harrison's 16th Ed. 362

- A. Exon
- B. Intron
- C. Cistron
- D. Recon

11 Which of the following defines 'Totipotency' ?

Lancet 2005;366:249-60

- A. Ability to form embryo & trophoblast of placenta
- B. Ability to differentiate into all cells of all germ layers
- C. Ability to differentiate into limited cell lineages appropriate to the location
- D. Ability to generate one cell type

12 Which of the following defines 'Pluripotency' ?

Lancet 2005;366:249-60

- A. Ability to form embryo & trophoblast of placenta
- B. Ability to differentiate into a limited cell lineages appropriate to the location
- C. Ability to differentiate into all cells of all germ layers
- D. Ability to generate one cell type

13 Which of the following defines 'Multipotency' ?

Lancet 2005;366:249-60

- A. Ability to form embryo & trophoblast of placenta
- B. Ability to differentiate into all cells of all germ layers
- C. Ability to differentiate into a limited cell lineages appropriate to the location
- D. Ability to generate one cell type

14 Which of the following defines 'Unipotency' ?

Lancet 2005;366:249-60

- A. Ability to form embryo & trophoblast of placenta
- B. Ability to differentiate into all cells of all germ layers
- C. Ability to differentiate into a limited cell lineages appropriate to the location
- D. Ability to generate one cell type

15 Which of the following is an example of 'Totipotent cell' ?

Lancet 2005;366:249-60

- A. Fertilised oocyte or zygote
- B. Embryonic stem cells

- C. Adult, somatic stem cells
D. Type II pneumocyte
- 16 Which of the following is an example of 'Pluripotent cell' ?**
Lancet 2005;366:249-60
A. Fertilised oocyte or zygote
B. Embryonic stem cells
C. Adult, somatic stem cells
D. Type II pneumocyte
- 17 Which of the following is an example of 'Multipotent cell' ?**
Lancet 2005;366:249-60
A. Fertilised oocyte or zygote
B. Embryonic stem cells
C. Adult, somatic stem cells
D. Type II pneumocyte
- 18 Which of the following is an example of 'Unipotent cell' ?**
Lancet 2005;366:249-60
A. Fertilised oocyte or zygote
B. Embryonic stem cells
C. Adult, somatic stem cells
D. Type II pneumocyte
- 19 Each of the 32 - 128 cells in morula is ?**
A. Totipotent
B. Pluripotent
C. Multipotent
D. Unipotent
- 20 Cells in Inner Cell Mass (ICM) of human blastocyst are ?**
A. Totipotent
B. Pluripotent
C. Multipotent
D. Unipotent
- 21 When does ICM form in blastocyst ?**
A. Prior to implantation
B. Simultaneously with implantation
C. After implantation
D. Any of the above
- 22 In humans, time from fertilization to implantation in uterine wall is about ?**
A. 3 days
B. 7 days
C. 14 days
D. 21 days
- 23 Liver is formed from ?**
A. Endoderm
B. Mesoderm
C. Ectoderm
D. All of the above
- 24 Thyroid is formed from ?**
A. Endoderm
B. Mesoderm
C. Ectoderm
D. All of the above
- 25 Eyes and ears are formed from ?**
A. Endoderm
B. Mesoderm
C. Ectoderm
D. All of the above
- 26 Kidney tubules are formed from ?**
A. Endoderm
B. Mesoderm
C. Ectoderm
D. All of the above
- 27 Urinary bladder and urethra are formed from ?**
A. Endoderm
B. Mesoderm
C. Ectoderm
D. All of the above
- 28 Allogeneic transplantation refers to transplantation of ?**
A. Genetically identical marrow
B. Own stored marrow
C. Genetically non-identical marrow
D. None of the above
- 29 Syngeneic transplantation refers transplantation of ?**
A. Genetically identical marrow
B. Own stored marrow
C. Genetically non-identical marrow
D. None of the above
- 30 Diseases commonly treated with autologous hematopoietic stem-cell transplantation include all except ?**
A. Neuroblastoma
B. Ovarian cancer
C. Germ-cell tumors
D. Aplastic anemia
- 31 Which of the following is a mitochondrial disease ?**
Harrison's 16th Ed. 375
A. MELAS syndrome
B. Leber's optic atrophy
C. Kearns-Sayre syndrome (KSS)
D. All of the above
- 32 When are Screening tests for Neural Tube defects (NTD) done during pregnancy ?**
A. First trimester
B. Second Trimester
C. Third Trimester
D. All of the above

- 33 During pregnancy, alpha fetoprotein (AFP) is synthesized by ?
A. Fetal Liver
B. Fetal Lung
C. Umbilical Cord
D. Placental tissue
- 34 Which of the following are "Second trimester serum markers" used for prenatal screening of Down syndrome ?
A. AFP, hCG, uE3 & Inhibin-A
B. AFP, hCG & Inhibin-A
C. hCG, uE3 & Inhibin-A
D. hCG
- 35 In maternal serum, pregnancy suspected of Down syndrome will show ?
A. Low AFP, high hCG, low unconjugated estriol & high inhibin-A
B. High AFP, high hCG, low unconjugated estriol & high inhibin-A
C. High AFP, high hCG, low unconjugated estriol & low inhibin-A
D. High AFP, high hCG, low unconjugated estriol & high inhibin-A
- 36 Mutation on IT15 gene causing Huntington's disease (HD) is located on which chromosome ?
A. 4
B. 7
C. X
D. 21
- 37 Huntington's disease is associated with which triplet repeat ?
A. GGG
B. CAG
C. GAA
D. CGA
- 38 In an autosomal recessive disorder, what is the chance of having an affected child if two unaffected people who carry one copy of mutated gene (carriers) each ?
A. 100 %
B. 50 %
C. 25 %
D. 0 %
- 39 If a women is suffering from any X-linked recessive disorder, then what is the chance of her passing the mutant gene to her son (XY) and daughter (XX) respectively?
A. 50 : 50
B. 50 : 30
C. 100 : 100
D. 100 : 50
- 40 What is the technical name given to the affected individual through whom a family with a genetic disorder is analysed ?
A. Mosaic
B. Proband
C. Genetic lead
D. Karyotype
- 41 Which type of cell division ensures that humans have the same number of chromosomes (46) in each generation?
A. Mitosis
B. Meiosis
C. Binary fission
D. Budding
- 42 How many chromosomes does each sperm and ova contribute at in the formation of zygote ?
A. 23 chromosomes
B. 46 chromosomes
C. 23 pairs of chromosome
D. 46 pairs of chromosome
- 43 The exchange of chromosomal segments between non-homologous chromosomes is known as ?
A. Translocation
B. Inversion
C. Heterozygosity
D. Duplication
- 44 Chromosome number in somatic cells of Drosophila is ?
A. 2
B. 4
C. 6
D. 8
- 45 DNA segment that participates in 'crossing over' is called ?
A. Replicon
B. Recon
C. Cistron
D. Muton
- 46 Inheritance of skin colour is an example of ?
A. Polygenic inheritance
B. Mendelian inheritance
C. Monogenic inheritance
D. Autosomal inheritance
- 47 Which condition is caused by a mutation that involves an entire chromosome rather than a single gene ?
A. Thalessemia
B. Hemophilia
C. Phenylketonuria
D. Down syndrome
- 48 Down syndrome in humans is due to ?
A. Monosomy
B. Nullisomy
C. Triploidy
D. Trisomy
- 49 The parents of a colour blind daughter would be ?
A. Colour blind father & carrier mother
B. Carrier father & colour blind mother

- C. Both parents are colour blind
D. None of the parents are colour blind
- 50 Which of the following is true when a colour blind man marries the daughter of a colour blind person ?
A. 50 % of sons will be colour blind
B. 50 % of daughters will be colour blind
C. All sons will be colour blind
D. Some sons and some daughters will be colour blind
- 51 In humans, a recessive gene can express either in homozygous condition, or singly when it is present on ?
A. Autosomes
B. X chromosome of female
C. X chromosome of male
D. None of the above
- 52 Gene which results in a non-viable progeny in homozygous condition is known as ?
A. Duplicate gene
B. Lethal gene
C. Linked gene
D. Epistatic gene
- 53 Enzyme that influences DNA synthesis that binds to one strand of DNA in 3' to 5' direction, using single-stranded DNA as a template is ?
A. DNA Polymerase
B. DNA Ligase
C. Topoisomerase
D. Telomerase
- 54 Which of the following DNA is present only in female gametes ?
A. Nuclear DNA
B. Mitochondrial DNA
C. Plasmid DNA
D. Satellite DNA
- 55 The name of the mechanism wherein a grandchild has an earlier onset and more severe disease than the parent, who had earlier onset than the grandparent is ?
A. Anticipation
B. Penetrance
C. Backcross
D. Familial
- 56 What is the situation called in which two different alleles for a genetic trait are both expressed ?
A. Codominance
B. Dominant
C. Recessive
D. Autosomal
- 57 Which amongst the following DNA is synthesized in laboratories from messenger RNA template ?
A. Complementary DNA
B. Template DNA
C. Plasmid DNA
D. Satellite DNA
- 58 What is the name for the study of 'physical appearance of chromosomes' ?
A. Cytogenetics
B. Cytokinesis
C. Cytomorphics
D. Karyotype
- 59 In electrophoresis, DNA molecule will move towards ?
A. Cathode
B. Anode
C. Neutral
D. None
- 60 Process of identification of multiple specific alleles on a person's DNA to produce a unique identifier for that person is called ?
A. Finger printing
B. Thumb printing
C. DNA printing
D. Blue printing
- 61 Which is the largest known gene in human genome ?
A. Dystrophin
B. CFTR
C. MEN1
D. BRCA1
- 62 Which syndrome results when the genetic constitution is XO ?
A. Turner syndrome
B. Down syndrome
C. Klinefelter syndrome
D. Marfan syndrome
- 63 The number of 'Barr bodies' in a person suffering from Turner syndrome is ?
A. Zero
B. One
C. Two
D. Three
- 64 Which of the following does not associate with Klinefelter syndrome ?
A. 47, XXY
B. Mosaic 46, XY
C. XXY trisomy
D. 46, XY
- 65 Through which biological process do two pieces of a chromosome pair separate during meiosis and randomly distribute to the germ cells ?
A. Segregation
B. Propagation

- C. Cleavage
D. Separation
- 66 All are classical features of Down syndrome except ?
A. Hypotonia
B. Mental retardation
C. Palmar crease
D. Loss of memory
- 67 DNA replication takes place in which phase of cell cycle ?
A. G_0
B. G_1
C. G_2
D. S
- 68 The formation of structural & functional proteins, RNA and enzymes take place in cell cycle during ?
A. G_0 phase
B. G_1 phase
C. G_2 phase
D. S stage
- 69 Formation of cell plate is completed in which phase of cell cycle ?
A. Mitotic phase
B. Cell division
C. Growth phase
D. All of the above
- 70 Period between two successive mitotic divisions is ?
A. Growth period
B. Interphase
C. Gap period
D. Synthetic period
- 71 The phase of cell division during which the chromosome number is halved is known as ?
A. Mitosis
B. Meiotic I
C. Meiotic II
D. Interphase
- 72 Chromatids of a chromosome are attached at a point called ?
A. Centriole
B. Telomere
C. Centromere
D. Centrosome
- 73 The chromosomes get aligned at the equator during ?
A. Prophase
B. Anaphase
C. Metaphase
D. Telophase
- 74 The formation of Chiasma is seen during ?
A. Diplotene
B. Pachytene
C. Zygotene
D. Leptotene
- 75 A single cell gives rise to 32 cells by dividing mitotically. How many times has it undergone mitotic division ?
A. 4
B. 5
C. 8
D. 16
- 76 The two cells formed during mitosis contain ?
A. Half amount of DNA & same set of chromosomes as those of parent cell
B. Same amount of DNA & same set of chromosomes as those of parent
C. Same amount of DNA & different set of chromosomes as those of parent cell
D. None of the above
- 77 How many cells will be produced if it divides mitotically 6 times ?
A. 32
B. 64
C. 128
D. 256
- 78 Two daughter cells produced at the end of meiotic I will have ?
A. Half amount of DNA & same number of chromosomes
B. Half amount of DNA & half number of chromosomes
C. Same amount of DNA & half number of chromosomes
D. Same amount of DNA & same number of chromosomes
- 79 DNA and RNA molecule differ in which of the following ?
A. Phosphate
B. Sugar
C. Purines
D. Kinds of bond
- 80 tRNA is found in ?
A. Mitochondria
B. Membranes
C. Cytoplasm
D. Nucleus
- 81 Width of a DNA molecule is ?
A. 20 Å
B. 200 Å
C. 3.4 Å
D. 34 Å
- 82 If on one helix of DNA, the base is Cytosine the other helix will have ?
A. Uracil
B. Guanine

- C. Thymine
D. Cytosine
- 83 In a RNA molecule, the base adenine compliments with ?
A. Uracil
B. Guanine
C. Thymine
D. Cytosine
- 84 Duchenne & Becker muscular dystrophy is an example of what kind of inheritance ?
A. Autosomal Dominant
B. Autosomal Recessive
C. X-linked Dominant
D. X-linked Recessive
- 85 What proportion of genes is common between 'First cousins' ?
A. 1/2
B. 1/4
C. 1/8
D. 1/16
- 86 Assuming that hemolytic jaundice in man is due to a dominant gene, but only 10% of people actually develop disease. If a heterozygous man marries a homozygous normal female, what proportion of the children would develop hemolytic disease ?
A. 1/2
B. 1/4
C. 1/10
D. 1/20
- 87 In a family has 4 children, 3 boys and 1 girl, what are the chances that the next baby will be a girl ?
A. 0
B. 1/4
C. 1/2
D. 1
- 88 Trisomy 18 (Edward's syndrome), is caused due to error in ?
A. Maternal non-disjunction, at first meiotic division
B. Maternal non-disjunction, at second meiotic division
C. Paternal non-disjunction, at first meiotic division
D. Post zygotic, non-disjunction
- 89 At which stage of Meiosis I, the chromosomes form a 'Quadrivalent' ?
A. Telophase
B. Pachytene
C. Diplotene
D. Zygotene
- 90 Which amongst the following is the most common 'Robertsonian translocation' reported in patients ?
A. rob(13q14q)
B. rob(14q21q)
C. rob(21q21q)
D. rob(15q16q)
- 91 Normally XX is for female and XY is for male, but in which of the following XX is for male and XY is for female ?
A. Reptiles
B. Amphibians
C. Birds
D. None of the above
- 92 Genes controlling secondary sexual characters are located on X chromosome. Male child normally gets these genes from ?
A. Only father
B. Only mother
C. Both the parents
D. Occurs due to mutation
- 93 Which of the following is not a microdeletion syndrome ?
A. Prader-Willi syndrome
B. Angelman syndrome
C. Charcot-Marie-Tooth syndrome type 1A
D. DiGeorge syndrome
- 94 Which of the following is not a microdeletion syndrome ?
A. Prader-Willi syndrome
B. Angelman syndrome
C. Beckwith-Wiedemann syndrome
D. DiGeorge syndrome
- 95 Amniocentesis is usually done at which week of gestation ?
Harrison's 16th Ed. 379
A. 8
B. 12
C. 16
D. 20
- 96 Chorionic villus sampling (CVS) is usually done at which week of gestation ?
Harrison's 16th Ed. 379
A. 4 to 6
B. 6 to 9
C. 9 to 12
D. 12 to 16
- 97 Which of the following is not a 'X-linked' disorder ?
Harrison's 16th Ed. 390
A. Hemophilia A
B. G6PD deficiency
C. Hereditary nonpolyposis colon cancer
D. Kallmann syndrome
- 98 Which of the following is not a 'X-linked' disorder ?
Harrison's 16th Ed. 390
A. Adrenoleukodystrophy
B. Duchenne & Becker muscular dystrophy

- C. Polycystic kidney disease
- D. Kallmann syndrome

99 Which of the following is not an 'autosomal recessive' disorder ?

Harrison's 16th Ed. 390

- A. Wilson's disease
- B. 21-Hydroxylase deficiency
- C. Hypertrophic cardiomyopathy
- D. α_1 Antitrypsin deficiency

100 Which of the following is not an 'autosomal recessive' disorder ?

Harrison's 16th Ed. 390

- A. Familial Mediterranean fever
- B. 21-Hydroxylase deficiency
- C. Wilson's disease
- D. Long QT syndrome

101 Which of the following is not an 'autosomal dominant' disorder ?

Harrison's 16th Ed. 390

- A. Malignant hyperthermia
- B. Hemochromatosis
- C. Familial Parkinson's disease
- D. Hyperkalemic periodic paralysis

102 Which of the following is not an 'autosomal dominant' disorder ?

Harrison's 16th Ed. 390

- A. Marfan syndrome
- B. Familial breast and ovarian cancer
- C. Kallmann syndrome
- D. Hereditary nonpolyposis colon cancer

Chapter 189. HIV / AIDS

103 In a HIV-infected individual, AIDS is present if CD4+ T cell count is ?

Harrison's 18th Ed. 1506

- A. < 200 / μ L
- B. < 250 / μ L
- C. < 300 / μ L
- D. < 350 / μ L

HIV-infected individual with a CD4+ T cell count of <200/ μ L has AIDS by definition, regardless of the presence of symptoms or opportunistic diseases. And, in anyone with HIV infection who develops one of the HIV-associated diseases considered to be indicative of a severe defect in cell-mediated immunity (category C).

104 The earliest documented case of HIV infection in humans was identified in 1959 in ?

N Engl J Med 2004;350:1872-80

- A. Congo
- B. Zambia
- C. Uganda
- D. Zaire

105 AIDS was first reported in which of the following ?

N Engl J Med 2001;344:1764-72

- A. British Medical Bulletin

- B. Morbidity and Mortality Weekly Report
- C. The Lancet
- D. Journal of Clinical Virology

106 Who is credited with the discovery of virus that causes AIDS ?

- A. Dr. Robert Gallo
- B. Dr. David Ho
- C. Dr. Clayton A. Buck
- D. Dr. Anthony S. Fauci

107 Who is known as "patient zero" by AIDS researchers ?

- A. Ryan White
- B. Earvin "Magic" Johnson
- C. Gaetan Dugas
- D. Arthur Ashe

108 Documented HIV infection is Category A, when which of the following conditions is present ?

Harrison's 18th Ed. 1507 Table 189-2

- A. Asymptomatic HIV infection
- B. Persistent generalized lymphadenopathy
- C. With accompanying illness/history of acute HIV infection
- D. Any of the above

109 Clinical category in asymptomatic HIV infection with CD4+ T cell count <200/ μ L is ?

Harrison's 18th Ed. 1506 Table 189-1

- A. A 1
- B. A 2
- C. A 3
- D. Any of the above

110 In Clinical Category A1, CD4+ T cell count is ?

Harrison's 18th Ed. 1506 Table 189-1

- A. > 200 / μ L
- B. > 300 / μ L
- C. > 400 / μ L
- D. > 500 / μ L

111 HIV belongs to the subfamily of ?

Harrison's 18th Ed. 1506

- A. Retroviridae
- B. Lentiviruses
- C. Human metapneumoviruses
- D. Coronaviruses

The etiologic agent of AIDS is HIV which belongs to the family of human retroviruses (Retroviridae) and the subfamily of lentiviruses.

112 Which of the following is false about HIV virus ?

Harrison's 18th Ed. 1506

- A. RNA virus
- B. Cytopathic virus
- C. Zoonotic infection
- D. None of the above

HIV-1 & HIV-2 are cytopathic RNA viruses. HIV-1 & HIV-2 are zoonotic infections.

113 HIV-1 came to humans from ?*Harrison's 18th Ed. 1506*

- A. Chimpanzee
- B. Sooty mangabey monkeys
- C. Rhesus macaque
- D. All of the above

114 HIV-2 originated from ?*Harrison's 18th Ed. 1506*

- A. Chimpanzee
- B. Sooty mangabey monkeys
- C. Rhesus macaque
- D. All of the above

The Pan troglodytes troglodytes species of chimpanzees is the natural reservoir of HIV-1 (M and N groups) and source of original human infection. HIV-2 is more closely related phylogenetically to simian immunodeficiency virus (SIV) found in sooty mangabeys than it is to HIV-1.

115 The diameter of mature HIV virion is ?*Journal of Clinical Virology 2005*

- A. 100 - 120 nm
- B. 140 - 160 nm
- C. 160 - 180 nm
- D. 180 - 200 nm

116 HIV is a ?*N Engl J Med 2004;350:1872-80*

- A. Acidic pH dependent virus
- B. Alkaline pH dependent virus
- C. Neutral pH dependent virus
- D. pH independent virus

117 The HIV envelope protein is a ?*N Engl J Med 2004;351:743*

- A. Monomer
- B. Dimer
- C. Trimer
- D. Tetramer

118 Nucleocapsid of HIV virion is ?*Journal of Clinical Virology 2005*

- A. Spherical
- B. Cone-shaped
- C. Cylinder-shaped
- D. Elliptical-shaped

119 Lipid bilayer of HIV mature virion includes approximately ?*Journal of Clinical Virology 2005*

- A. 24 spikes
- B. 60 spikes
- C. 72 spikes
- D. 96 spikes

120 Which are the two major envelope proteins of HIV ?*Harrison's 18th Ed. 1506*

- A. Glycoprotein 120 and glycoprotein 41 subunits
- B. Glycoprotein 120 and glycoprotein 39 subunits

- C. Glycoprotein 160 and glycoprotein 41 subunits

- D. Glycoprotein 160 and glycoprotein 39 subunits

HIV virion is an icosahedral structure with numerous external spikes formed by two major envelope proteins - external gp120 and transmembrane gp41.

121 The glycoprotein 41 subunit of HIV envelope protein has which of the following component ?*N Engl J Med 2004;351:744*

- A. N-terminal hydrophobic domain termed fusion peptide
- B. Helical region 1
- C. Helical region 2
- D. All of the above

122 What percentage of homology exists between HIV-2 DNA and HIV-1 DNA ?*N Engl J Med 2004;350:1872-80*

- A. 10 to 20 percent
- B. 20 to 40 percent
- C. 40 to 60 percent
- D. 60 to 80 percent

123 Which of the following statements about HIV-2 is true ?*Harrison's 18th Ed. 1508*

- A. HIV-2 has *vpu* gene and not *vpx* gene
- B. HIV-2 has *vpx* gene and not *vpu* gene
- C. HIV-2 has both *vpx* and *vpu* gene
- D. HIV-2 does not have *vpx* and *vpu* gene

*The major difference between the genomes of HIV-1 and HIV-2 is the fact that HIV-2 lacks the *vpu* gene and has a *vpx* gene not contained in HIV-1.*

124 Which viral-envelope glycoprotein of HIV-1 is required for attachment of virions to the CD4 cellular receptors ?*Harrison's 18th Ed. 1507*

- A. gp 80
- B. gp 100
- C. gp 120
- D. gp 140

Replication cycle of HIV begins with the high-affinity binding of the gp120 protein via a portion of its V1 region near N terminus to its receptor on host cell surface - CD4 molecule. Upon binding to CD4, gp120 undergoes conformational change that facilitates binding to CCR5 & CXCR4 co-receptors.

125 Which component of HIV is first inserted into the membrane of the target cell ?*Harrison's 18th Ed. 1507*

- A. Glycoprotein 41
- B. Glycoprotein 24
- C. Glycoprotein 120
- D. Glycoprotein 160

After binding of viral envelope gp120 to CD4 molecule, gp41 penetrates the plasma membrane & then coils upon itself to bring virion & target cell together.

126 CD4 molecule is a ?*Harrison's 18th Ed. 1507*

- A. 35-kDa protein
- B. 45-kDa protein
- C. 55-kDa protein
- D. 65-kDa protein

127 CD4 molecule is found on the surface of ?*Harrison's 18th Ed. 1507*

- A. A subset of T lymphocytes
- B. Monocytes / Macrophages
- C. Dendritic / Langerhans cells
- D. All of the above

CD4 molecule is a 55-kDa protein found on a subset of T lymphocytes that are responsible for helper function in immune system. It is also expressed on surface of monocytes/macrophages & dendritic/Langerhans cells.

128 Major co-receptors for HIV-1 is ?*Harrison's 18th Ed. 1507*

- A. CCR5
- B. CXCR4
- C. A+B
- D. Neither A, nor B

129 CCR5 & CXCR4 belong to which family of cellular receptors ?*Harrison's 18th Ed. 1507*

- A. G protein-coupled receptors
- B. Tyrosine kinase receptors
- C. Cytokine receptors
- D. Serine kinase receptors

The two major co-receptors for HIV-1 are CCR5 and CXCR4. Both receptors belong to the family of seven-transmembrane-domain G protein-coupled cellular receptors.

130 Which of the following cells express C-type lectin receptors on their surface ?*Harrison's 18th Ed. 1507*

- A. T lymphocytes
- B. Monocytes
- C. Macrophages
- D. Dendritic cells

Certain dendritic cells express C-type lectin receptors on their surface, one of which is called DC-SIGN that bind with high affinity to HIV gp120 envelope protein. When dendritic cells engage with CD4+ T cells, HIV virus is presented to CD4+ T cells.

131 Preintegration complex is composed of ?*Harrison's 18th Ed. 1507*

- A. Viral RNA
- B. Viral enzymes
- C. Capsid protein coat
- D. All of the above

Following fusion, the preintegration complex, composed of viral RNA and viral enzymes and surrounded by a capsid protein coat, is released into the cytoplasm of the target cell.

132 Protein coat of the preintegration complex opens ?*Harrison's 18th Ed. 1507*

- A. Before reverse transcription of genomic RNA into DNA
- B. During reverse transcription of genomic RNA into DNA
- C. After reverse transcription of genomic RNA into DNA
- D. None of the above

As the preintegration complex traverses the cytoplasm to reach the nucleus, viral reverse transcriptase enzyme catalyzes reverse transcription of genomic RNA into DNA and protein coat opens to release double-stranded HIV-DNA.

133 Antiretroviral effect of the cellular protein APOBEC3G (or CEM15) is counteracted by ?*Harrison's 18th Ed. 1507*

- A. HIV-1 Vif
- B. HIV-1 Nef
- C. HIV-1 vpu
- D. HIV-1 vpr

APOBEC family of cellular proteins inhibits progression of virus infection after virus has entered the cell. APOBEC proteins bind to nascent reverse transcripts and deaminate viral cytidine, causing hypermutation of HIV genomes. HIV protects itself from APOBEC through its viral protein Vif that targets APOBEC.

134 HIV viral uncoating involves which of the viral proteins ?*Journal of Clinical Virology 2005*

- A. MA
- B. Nef
- C. Vif
- D. All of the above

135 Which of the following HIV gene products possess antiapoptotic properties ?*Harrison's 18th Ed. 1527*

- A. Envelope
- B. Tat
- C. Nef
- D. Vpr

136 HIV virus replicates mainly in ?*Harrison's 17th Ed. 1153*

- A. Blood
- B. Bone marrow
- C. Lymphoid tissue
- D. All of the above

Regardless of the portal of entry of HIV, lymphoid tissues are the major anatomic sites for the establishment and propagation of HIV infection. Virus replication occurs mainly in lymphoid tissue and not in blood. Level of plasma viremia directly reflects virus production in lymphoid tissue.

137 The HIV viral RNA genome is converted into a full-length double-stranded DNA by viral RT by a process called ?*Journal of Clinical Virology 2005*

- A. Retrotranscription
- B. Transcription
- C. Duplication
- D. Deletion

138 HIV virus preintegration complex docks to nuclear membrane and is directed by ?*Journal of Clinical Virology 2005*

- A. HIV-1 vpr
- B. HIV-1 Nef
- C. HIV-1 vpu
- D. HIV-1 vif

139 Which of the following HIV-1 genes encode structural proteins of the virus ?*Harrison's 18th Ed. 1508*

- A. gag

- B. pol
- C. env
- D. All of the above

HIV-1 has genes that encode the structural proteins of virus.

140 Which of the following HIV-1 gene that encodes the proteins that form the core of the virion ?

Harrison's 18th Ed. 1508

- A. gag
- B. pol
- C. env
- D. All of the above

gag encodes the proteins that form the core of the virion (including p24 antigen)

141 Which of the following HIV-1 gene encodes enzymes responsible for reverse transcription & integration ?

Harrison's 18th Ed. 1508

- A. gag
- B. pol
- C. env
- D. All of the above

pol encodes the enzymes responsible for protease processing of viral proteins, reverse transcription and integration.

142 Which of the following HIV-1 gene encodes the envelope glycoproteins ?

Harrison's 18th Ed. 1508

- A. gag
- B. pol
- C. env
- D. All of the above

env encodes the envelope glycoproteins.

143 Which of the HIV-1 genes code for proteins involved in modification of host cell to enhance virus growth and regulation of viral gene expression ?

Harrison's 18th Ed. 1508

- A. tat
- B. rev
- C. nef
- D. All of the above

HIV-1 contains six genes named tat, rev, nef, vif, vpr & vpu which code for proteins involved in the modification of the host cell to enhance virus growth and the regulation of viral gene expression.

144 HIV viral linear double-stranded DNA in the preintegration complex is inserted into the host chromosome by ?

Journal of Clinical Virology 2005

- A. Viral IN
- B. Viral EN
- C. Viral FN
- D. Viral KN

From cytoplasm HIV viral DNA enters the nucleus through nuclear pore where it is integrated into host cell chromosomes (introns of active genes & regional hotspots) through the action of virally encoded enzyme integrase (IN).

145 Lipid rafts is related to ?

Harrison's 18th Ed. 1508

- A. HIV-1 cell membrane
- B. Host cell membrane
- C. Host nuclear membrane
- D. All of the above

Budding of progeny virion occurs through specialized regions in lipid bilayer of host cell membrane known as lipid rafts, where the core acquires its external envelope.

146 Which of the following is not a HIV-1 group ?

Harrison's 18th Ed. 1509

- A. L
- B. M
- C. N
- D. O

147 Which of the following HIV-1 groups is responsible for most HIV infections in world ?

Harrison's 18th Ed. 1509

- A. M
- B. N
- C. O
- D. None of the above

HIV-1 is most closely related to viruses isolated from chimpanzees & gorillas. There are three groups of HIV-1 - group M (major), which is responsible for most of the infections in the world, group O (outlier), a relatively rare viral form found originally in Cameroon, Gabon, and France and group N, first identified in a Cameroonian woman with AIDS.

148 The chimpanzee subspecies Pan troglodytes troglodytes is not the natural reservoir of ?

Harrison's 18th Ed. 1509

- A. HIV-1 M
- B. HIV-1 N
- C. HIV-1 O
- D. None of the above

The chimpanzee subspecies Pan troglodytes troglodytes is the natural reservoir of the HIV-1 M and N groups. HIV-1 O group is most closely related to viruses found in Cameroonian gorillas.

149 Which of the following is not a subtype of HIV-1 M group ?

Harrison's 18th Ed. 1509

- A. A
- B. B
- C. E
- D. F

The HIV-1 M group comprises nine subtypes, or clades, designated A, B, C, D, F, G, H, J and K, as well as a number of major & minor circulating recombinant forms (CRFs). Seven strains account for the majority of HIV infections globally: HIV-1 subtypes A, B, C, D, G and two CRFs, CRF01_AE and CRF02_AG.

150 Which of the following about circulating recombinant forms (CRFs) is false ?

Harrison's 18th Ed. 1509

- A. Generated by infection with two subtypes
- B. CRF01_AE is predominant in southeast Asia
- C. CRF02_AG is predominant in west & central Africa
- D. None of the above

CRFs are generated by infection in one patient with two subtypes that recombine & create a different virus. AE virus or CRF01_AE is common in southeast Asia & is often called as E. CRF02_AG is common in west & central Africa.

151 Which of the following HIV subtypes are closely related to each other ?
Harrison's 18th Ed. 1509

- A. A & B
- B. A & C
- C. B & C
- D. B & D

HIV-1 M group subtypes A & F are now subdivided into A1 & A2, F1 & F2. Subtypes B & D are too close to be separate subtypes & should be considered sub-subtypes.

152 Which subtype of M group of HIV-1 is prevalent in USA ?
Harrison's 18th Ed. 1510

- A. A
- B. B
- C. C
- D. D

Subtype B viruses are the predominant viruses seen in United States, Canada, certain countries in South America, western Europe and Australia.

153 Which subtype of M group of HIV-1 is most prevalent worldwide ?
Harrison's 18th Ed. 1510

- A. A
- B. B
- C. C
- D. D

Subtype C viruses (of the M group) are the most common form worldwide.

154 Which subtype of M group of HIV-1 is most prevalent in India ?
Harrison's 18th Ed. 1510

- A. A
- B. B
- C. C
- D. D

Subtype C is prevalent in India. CRF01_AE accounts for most infections in south & southeast Asia.

155 Which subtype of M group of HIV-1 is most prevalent in sub-Saharan Africa ?
Harrison's 18th Ed. 1510

- A. A
- B. B
- C. C
- D. D

In sub-Saharan Africa, home to ~two-thirds of all individuals living with HIV/AIDS, >50% of infections are caused by subtype C.

156 HIV is transmitted by all except ?
Harrison's 18th Ed. 1510

- A. Sexual contact
- B. Blood and blood products
- C. Infected mothers to infants
- D. Mosquito bite

HIV is transmitted by both homosexual & heterosexual contact, by blood & blood products, and by infected mothers to infants or via breast milk. There is no evidence that HIV is transmitted by casual contact or by a mosquito bite.

157 Worldwide, the most common mode of infection with HIV is ?
Harrison's 18th Ed. 1510

- A. Homosexual transmission
- B. Heterosexual transmission
- C. Blood and blood products
- D. Infected mothers to infants

Worldwide, the most common mode of infection with HIV is heterosexual transmission.

158 Which of the following about HIV transmission is false ?
Harrison's 18th Ed. 1510

- A. Male-to-female HIV transmission is more efficient than female-to-male transmission
- B. STDs with genital ulcerations strongly associated with HIV transmission
- C. Nonulcerative inflammatory STDs associated with increased risk of HIV transmission
- D. Receptive anal intercourse is a much less efficient mode of HIV transmission than oral sex

Male-to-female HIV transmission is more efficient than female-to-male transmission due to prolonged exposure to infected seminal fluid of the vaginal, cervical mucosa and endometrium. Penis & urethral orifice are exposed relatively briefly to infected vaginal fluid. Treponema pallidum, Haemophilus ducreyi & herpes simplex virus are causes of genital ulcerations linked to HIV transmission. Chlamydia trachomatis, Neisseria gonorrhoeae, and Trichomonas vaginalis produce nonulcerative inflammatory STDs and are associated with an increased risk of HIV transmission. Oral sex is a much less efficient mode of transmission of HIV than is receptive anal intercourse.

159 Sexual transmission of HIV is rare if the infected partner has a plasma level of HIV RNA less than ?
Harrison's 18th Ed. 1513

- A. 1700 copies per milliliter
- B. 2500 copies per milliliter
- C. 3500 copies per milliliter
- D. 4500 copies per milliliter

Chief predictor of heterosexual transmission of HIV is the level of plasma viremia. Sexual transmission is rare when infected partner has a plasma level of <1700 copies of HIV RNA per milliliter. The rate of HIV transmission per coital act is highest during early stage of HIV infection when plasma HIV RNA levels are highest & in advanced disease as the viral set point increases.

160 Which of the following is strongly associated with a higher risk of HIV infection ?
Harrison's 18th Ed. 1513

- A. Lack of circumcision
- B. Adolescent girls
- C. Use of oral contraceptives
- D. All of the above

Male circumcision is associated with a lower risk of HIV infection among men. Use of oral contraceptives is associated with increased incidence of HIV infection due to drug-induced changes in cervical mucosa. Adolescent girls are more susceptible to infection due to an immature genital tract with increased cervical ectopy or exposed columnar epithelium.

161 Parenteral transmission of HIV occurs by ?
Harrison's 18th Ed. 1513

- A. Intravenous puncture
- B. Subcutaneous puncture
- C. Intramuscular puncture
- D. All of the above

Parenteral transmission of HIV can occur by IV puncture, subcutaneous puncture ("skin popping") or intramuscular puncture ("muscling").

162 Transfusions of which of the following is capable of transmitting HIV infection ?*Harrison's 18th Ed. 1513*

- A. Packed red blood cells
- B. Platelets
- C. Leukocytes
- D. All of the above

*Transfusions of whole blood, packed red blood cells, platelets, leukocytes, concentrates of clotting factors and plasma are all capable of transmitting HIV infection.***163 Administration of which of the following is not associated with transmission of HIV infection ?***Harrison's 18th Ed. 1513*

- A. Hyperimmune γ globulin
- B. Hepatitis B immune globulin
- C. Plasma-derived hepatitis B vaccine
- D. All of the above

*Hyperimmune γ globulin, hepatitis B immune globulin, plasma-derived hepatitis B vaccine and Rh₀ immune globulin have not been associated with transmission of HIV infection. The procedures involved in processing these products either inactivate or remove the virus.***164 Transmission of HIV can occur due to all except ?***Harrison's 18th Ed. 1513*

- A. Semen used in artificial insemination
- B. Tissues used in organ transplantation
- C. Rh₀ immune globulin administration
- D. Breast milk

*Semen used in artificial insemination and tissues used in organ transplantation can transmit HIV.***165 Risk of HIV transmission following skin puncture from a needle contaminated with HIV (+) blood is ?***Harrison's 18th Ed. 1514*

- A. ~ 0.1 %
- B. ~ 0.2 %
- C. ~ 0.3 %
- D. ~ 0.4 %

*Risk of HIV transmission following skin puncture from a needle or a sharp object contaminated with blood from person with HIV infection is ~0.3%. Transmission of HIV through intact skin has not been documented. Risk of hepatitis B virus (HBV) infection following percutaneous exposure is ~6 - 30% in nonimmune individuals and ~1.8% in hepatitis C virus (HCV) infection.***166 Eclipse phase of HIV-1 infection generally lasts for ?***N Engl J Med 2011;364:1943-54*

- A. 1 to 7 days
- B. 7 to 21 days
- C. 21 to 42 days
- D. 48 to 72 days

*Immediately after exposure & transmission, as HIV-1 is replicating in the mucosa, submucosa, and draining lymphoreticular tissues, the virus cannot be detected in plasma. This eclipse phase generally lasts 7 to 21 days.***167 Which of the following is a poor target for HIV-1 infection ?***N Engl J Med 2011;364:1943-54*

- A. CD4 T cells
- B. Monocyte-derived macrophages
- C. Langerhans' cells
- D. Submucosal dendritic cells

*CD4 T cells & Langerhans' cells are the first targets of HIV-1 virus. Other dendritic cells play an important accessory role. Monocyte-derived macrophages are generally poor targets for infection as compared with CD4 T cells.***168 Which of the following is considered potentially infectious ?***Harrison's 18th Ed. 1514*

- A. Feces
- B. Urine
- C. Saliva
- D. None of the above

*Semen, vaginal secretions, cerebrospinal fluid, synovial fluid, pleural fluid, peritoneal fluid, pericardial fluid and amniotic fluid are considered potentially infectious. Feces, nasal secretions, saliva, sputum, sweat, tears, urine, and vomitus are not considered potentially infectious.***169 HIV infection can be transmitted from an infected mother to her fetus during ?***Harrison's 18th Ed. 1515*

- A. Pregnancy
- B. Delivery
- C. Breast-feeding
- D. All of the above

*HIV infection can be transmitted from an infected mother to her fetus during pregnancy, during delivery, or by breast-feeding.***170 Maternal-fetal / infant transmission of HIV infection to fetus occurs most commonly in ?***Harrison's 18th Ed. 1515*

- A. First trimester
- B. Second trimester
- C. Third trimester
- D. Perinatal period

*HIV can be transmitted to fetus as early as first and second trimester of pregnancy but maternal transmission to fetus occurs most commonly in the perinatal period.***171 Without prophylactic antiretroviral therapy, what is the probability of HIV transmission from mother to infant/fetus in developing countries ?***Harrison's 18th Ed. 1515*

- A. 10 - 25 %
- B. 25 - 35 %
- C. 35 - 55 %
- D. 55 - 75 %

*Without prophylactic antiretroviral therapy, probability of HIV transmission from mother to infant/fetus in developing countries is 25 - 35 % and 15 - 25 % in industrialized countries.***172 The best-documented factor that is associated with higher rates of maternal-fetal/infant transmission is ?***Harrison's 18th Ed. 1515*

- A. Presence of chorioamnionitis at delivery
- B. STDs during pregnancy
- C. High maternal levels of plasma viremia
- D. Low maternal CD4+ T cell counts

*Higher rates of transmission is associated high maternal levels of plasma viremia.***173 Rate of mother-to-baby transmission is 0% in women with HIV RNA copies less than ?***Harrison's 18th Ed. 1515*

- A. < 1000 per milliliter of blood

- B. < 10000 per milliliter of blood
- C. < 100000 per milliliter of blood
- D. < 1000000 per milliliter of blood

Rate of mother-to-baby transmission was 0% among women with <1000 copies/mL of blood of HIV RNA, 16.6% with 1000 - 10,000 copies/mL, 21.3% with 10,001 - 50,000 copies/mL, 30.9% with 50,001 - 100,000 copies/mL, and 40.6% with >100,000 copies/mL.

174 Increased mother-to-child HIV transmission is correlated with ?

Harrison's 18th Ed. 1515

- A. Low maternal CD4+ T cell counts
- B. Closer HLA match between mother and child
- C. Prolonged interval between membrane rupture & delivery
- D. All of the above

175 Recommendation to reduce perinatal transmission of HIV is ?

Harrison's 18th Ed. 1515

- A. Zidovudine treatment from II trimester onwards
- B. Cesarean section delivery
- C. Avoidance of breast-feeding
- D. All of the above

Zidovudine treatment of HIV-infected pregnant women from the beginning of second trimester through delivery and of infant for 6 weeks following birth decreases rate of intrapartum and perinatal transmission of HIV. Obstetric management that minimizes exposure of infant to maternal blood & genital secretions and avoidance of breast-feeding also reduce transmission.

176 Which of the following ARV is used to reduce perinatal transmission of HIV ?

Harrison's 18th Ed. 1515

- A. Zidovudine
- B. Lamivudine
- C. Nevirapine
- D. All of the above

HIV (+) pregnant women seen by health care provider for the first time at or near the time of delivery can be given zidovudine with lamivudine. Nevirapine can be given as a single dose to mother at the onset of labor and a single dose to infant within 72 hours of birth.

177 Risk factor that increases the likelihood of transmission of HIV via breast-feeding is ?

Harrison's 18th Ed. 1515

- A. Detectable levels of HIV in breast milk
- B. Presence of mastitis
- C. Maternal vitamin A deficiency
- D. All of the above

Risk factors for mother-to-child transmission of HIV via breast-feeding include detectable levels of HIV in breast milk, presence of mastitis, low maternal CD4+ T cell counts & maternal vitamin A deficiency.

178 Soluble salivary factor that inhibits HIV is ?

Harrison's 18th Ed. 1515

- A. Secretory lymphocyte protease inhibitor (SLPI)
- B. Secretory leukocyte protease inhibitor (SLPI)
- C. Secretory lymphokine protease inhibitor (SLPI)
- D. Secretory leukokine protease inhibitor (SLPI)

Secretory leukocyte protease inhibitor (SLPI) blocks HIV infection. Submandibular saliva reduces HIV infectivity by stripping gp120 from surface of virions. Disruption & lysis of HIV-infected cells occurs due to hypotonicity of oral secretions.

179 What proportion of HIV/AIDS patients are females ?

Harrison's 18th Ed. 1516

- A. ~ 10 %
- B. ~ 33 %
- C. ~ 50 %
- D. ~ 66 %

Among people living with HIV/AIDS, ~50% are female.

180 Which one of the following statements about 'Dendritic cells' is false ?

N Engl J Med 2004;350:1872-80

- A. Capture antigens in bone marrow
- B. Transport captured antigens to lymphoid organs
- C. Digest captured antigens & display resulting peptides to T cells
- D. Moderately susceptible to HIV infection because they express low levels of CD4, CXCR4 & CCR5

181 Which of the following about Dendritic cells is false ?

N Engl J Med 2004;350:1872-80

- A. Play a role in initiation of HIV infection
- B. Express C-type lectin receptors (DC-SIGN)
- C. Can trap HIV & mediate transinfection of CD4+ T cells
- D. None of the above

182 Which of the following about DC-SIGN is false ?

N Engl J Med 2004;350:1872-80

- A. Expressed by Langerhans cells
- B. DC-SIGN binds with high affinity to HIV envelope gp120
- C. Facilitates CD4-mediated infection of dendritic cells
- D. DC-SIGN allows efficient infection by aggregating virus on surface of dendritic cells

DC-SIGN (dendritic cell-specific intercellular adhesion molecule 3-grabbing nonintegrin) is expressed on dendritic cells. Langerhans cells belong to the family of Dendritic cells

183 Receptor that is abundantly expressed by macrophages facilitating HIV infection is ?

N Engl J Med 2004;350:1872-80

- A. Heparan sulfate proteoglycans - Syndecan
- B. DC-SIGN
- C. CD90
- D. CD8+

184 Which of the following is the hallmark of HIV infection ?

Harrison's 18th Ed. 1519

- A. Aberrant immune activation
- B. Chronic, persistent infection
- C. Profound immunodeficiency
- D. All of the above

HIV is an RNA virus whose hallmark is the reverse transcription of its genomic RNA to DNA by the enzyme reverse transcriptase. Aberrant immune activation and Chronic, persistent infection are also hallmarks of HIV infection. Profound immunodeficiency resulting from a progressive quantitative & qualitative deficiency of helper T cells. HIV is an RNA virus whose hallmark is the reverse transcription of its genomic RNA to DNA by the enzyme reverse transcriptase.

185 Which of the following is essential for efficient fusion & entry of HIV-1 into its target cells ?

Harrison's 18th Ed. 1519

- A. CD4 molecule

- B. CCR5
- C. CXCR4
- D. All of the above

CD4 + T cell is defined phenotypically by the presence on its surface of CD4 molecule, which serves as the primary cellular receptor for HIV. HIV uses two major co-receptors for fusion and entry - CCR5 and CXCR4 (seven-transmembrane-domain G protein-coupled family of receptors).

186 What proportion of individuals with primary HIV infection experience the "acute HIV syndrome" ?

Harrison's 18th Ed. 1521

- A. ~ 10 %
- B. ~ 25 %
- C. ~ 50 %
- D. ~ 75 %

~ 50 % of individuals with primary HIV infection experience the "acute HIV syndrome". They have high levels of viremia.

187 Acute HIV syndrome symptoms resemble which of the following ?

Harrison's 18th Ed. 1521

- A. Serum sickness like symptoms
- B. Flu-like symptoms
- C. Acute mononucleosis-like symptoms
- D. Any of the above

Acute mononucleosis-like symptoms are well correlated with the presence of HIV viremia.

188 Slope of HIV disease progression correlate with the set point of the level of steady-state plasma viremia after how many months of infection ?

Harrison's 18th Ed. 1521

- A. ~ 3 months
- B. ~ 6 months
- C. ~ 12 months
- D. ~ 18 months

Level of steady-state viremia is called the viral set point which correlate with the slope of HIV disease progression. Viral set point at ~1 year has important prognostic implications for the progression of HIV disease. HIV-infected individuals who have a low set point at 6 months to 1 year progress to AIDS much more slowly than individuals whose set point is very high. Levels of viremia generally increase and level of CD4+ T cells in the blood decreases as disease progresses.

189 Chronicity associated with persistent virus replication is seen in ?

Harrison's 18th Ed. 1522

- A. HIV infection
- B. HBV infection
- C. HCV infection
- D. All of the above

Chronicity associated with persistent virus replication is seen in HIV, HBV and HCV infections.

190 What is the mechanism of HIV infection to evade elimination by the immune system ?

Harrison's 18th Ed. 1522

- A. Selection of mutants that escape control by CTLs
- B. High rate of replication & continual mutation of virus
- C. Disappearance of clones of CD8+ CTLs
- D. All of the above

Initial burst of viremia brings about several processes that help HIV survive. They are selection of mutants that escape control by CD8+ cytolytic T lymphocytes (CTLs), high rate of virus replication

and the continual mutation of virus, disappearance of clones of CD8+ CTLs, activation of apoptosis, downregulation of HLA class I molecules on the surface of HIV-infected cells by the Nef protein of HIV, elimination of memory CD4+ T cells in GALT, sequestration of infected cells in immunologically privileged sites like CNS and formation of a pool of latently infected cells.

191 Mechanism by which HIV evades neutralizing responses is ?

Harrison's 18th Ed. 1522

- A. Hypervariability in primary sequence of the envelope
- B. Extensive glycosylation of the envelope
- C. Conformational masking of neutralizing epitopes
- D. All of the above

Envelope proteins gp120 and gp41 are the principal targets of neutralizing antibodies against HIV. HIV employs three mechanisms to evade neutralizing responses: hypervariability in primary sequence of the envelope, extensive glycosylation of the envelope & conformational masking of neutralizing epitopes.

192 Which of the following acts as a latent reservoir of HIV infected cells ?

Harrison's 18th Ed. 1522

- A. Lymphoid tissue
- B. Peripheral blood
- C. CNS
- D. All of the above

Reservoirs of HIV infected cells, latent or otherwise, exist in lymphoid tissue, peripheral blood & CNS.

193 Half-life of a circulating HIV virion is ?

Harrison's 18th Ed. 1523

- A. ~ 30 - 60 minutes
- B. ~ 60 - 90 minutes
- C. ~ 90 - 120 minutes
- D. ~ 120 - 180 minutes

Half-life of a circulating virion is ~30-60 min and that of productively infected cells is 1 day.

194 What quantity of HIV virions are produced and cleared from the circulation each day ?

Harrison's 18th Ed. 1523

- A. ~ 10^{10} - 10^{11} virions
- B. ~ 10^{11} - 10^{12} virions
- C. ~ 10^{12} - 10^{13} virions
- D. ~ 10^{13} - 10^{14} virions

Through studies of relatively steady level of plasma viremia and of infected cells, it is shown that ~ 10^{10} - 10^{11} virions are produced and cleared from the circulation each day.

195 Minimal duration of the HIV-1 replication cycle in vivo is ?

Harrison's 18th Ed. 1523

- A. ~ 2 days
- B. ~ 7 days
- C. ~ 14 days
- D. ~ 21 days

The minimal duration of the HIV-1 replication cycle in vivo is ~2 days.

196 With ARV therapy, decrease in virus replication occurs in ?

Harrison's 18th Ed. 1523

- A. Spleen
- B. Lymph nodes
- C. Peripheral blood
- D. All of the above

Decrease in plasma viremia after ARV therapy correlates closely with a decrease in virus replication in lymph nodes, confirming that lymphoid tissue is the main site of HIV replication and the main source of plasma viremia.

197 CDC case definition of AIDS includes all HIV-infected individuals with CD4+ T cell counts ?

Harrison's 18th Ed. 1524

- A. < 200 / μ L
- B. < 250 / μ L
- C. < 300 / μ L
- D. < 350 / μ L

CDC case definition of AIDS includes all HIV-infected individuals with CD4+ T cell counts < 200 / μ L.

198 Median time from primary HIV infection to development of AIDS in untreated patients in developed world is ?

Harrison's 18th Ed. 1522

- A. ~ 3 years
- B. ~ 5 years
- C. ~ 10 years
- D. ~ 15 years

The median time from primary HIV infection to the development of AIDS in untreated individuals in the developed world is ~10 years.

199 Individuals are considered to be long-term survivors if they remain alive for how many years after initial infection ?

Harrison's 18th Ed. 1524

- A. 5
- B. 10
- C. 15
- D. 20

Individuals are considered to be long-term survivors if they remain alive for 20 years after initial infection. Previously, it was 10 - 15 years.

200 Which of the following is not a characteristic feature of long-term nonprogressor ?

Harrison's 18th Ed. 1524

- A. Infected with HIV for a long period (>10 years)
- B. CD4+ T cell counts in the normal range
- C. Received ARV therapy
- D. Relatively low, but detectable levels of plasma viremia

Characteristic features of long-term nonprogressor are : infected with HIV for a long period (>=10 years), CD4+ T cell counts in normal range, who had not received ARV therapy, relatively low detectable levels of plasma viremia, normal immune function, normal-appearing lymphoid tissue architecture on lymph node biopsy. In general, long-term nonprogressors manifested robust HIV-specific immune responses, both humoral (neutralizing antibodies) and cell-mediated (HIV-specific CTLs). Long-term nonprogressors are by definition long-term survivors, however, the reverse is not always true.

201 Elite nonprogressors have HIV RNA levels of ?

Harrison's 18th Ed. 1543

- A. < 50 copies per milliliter
- B. < 100 copies per milliliter
- C. < 150 copies per milliliter
- D. < 200 copies per milliliter

Elite nonprogressors have HIV RNA levels < 50 copies per milliliter.

202 Which of the following plays a direct role in restriction of virus replication ?

Harrison's 17th Ed. 1153

- A. HLA B*3701

B. HLA B*4701

C. HLA B*5701

D. HLA B*6701

HLA B*5701 or HLA B*2705 alleles plays a direct role in restriction of virus replication.

203 Host genetic factors that delay the progression of HIV disease include all except ?

Harrison's 18th Ed. 1528

- A. Heterozygosity for CCR5-32 deletion
- B. Heterozygosity for CCR2-64I mutation
- C. Heterozygosity for SDF1-3'A mutation
- D. Heterozygosity for RANTES-28G mutation

Host genetic factors that delay the progression of HIV disease include heterozygosity for CCR5-32 deletion, heterozygosity for CCR2-64I mutation, homozygosity for SDF1-3'A mutation and heterozygosity for RANTES-28G mutation.

204 HIV individuals co-infected with which of the following have lower mortality ?

Harrison's 18th Ed. 1552

- A. HBV
- B. HCV
- C. GB virus C
- D. All of the above

Individuals co-infected with HIV and hepatitis G virus also called GB virus C (GBV-C) have lower mortality than HIV-infected individuals without GBV-C infection.

205 Which of the following statements is false ?

Harrison's 18th Ed. 1528

- A. SDF-1 is the natural ligand for CXCR4
- B. RANTES is the natural ligand for CCR5
- C. CCR5 is the major co-receptor for R5 or macrophage-tropic strains of HIV
- D. None of the above

SDF-1 is the natural ligand for CXCR4. RANTES (CCL5) expression is the natural ligand for CCR5 and CCR5 is the major co-receptor for R5 or macrophage-tropic strains of HIV.

206 Lymphoid tissues are the major anatomic sites for establishment & propagation of HIV infection when portal of entry of HIV is ?

Harrison's 18th Ed. 1524

- A. By sexual route
- B. By parenteral route
- C. Mother to infant transmission
- D. All of the above

Regardless of the portal of entry of HIV, lymphoid tissues are the major anatomic sites for the establishment and propagation of HIV infection. Virus replication occurs mainly in lymphoid tissue and not in blood and level of plasma viremia reflects virus production in lymphoid tissue.

207 Earliest burst of virus replication occurs in ?

Harrison's 18th Ed. 1525

- A. Peripheral lymphoid tissue
- B. Blood
- C. Gut-associated lymphoid tissue (GALT)
- D. All of the above

The earliest burst of virus replication occurs in gut-associated lymphoid tissue (GALT) associated with marked depletion of CD4+ T cells.

208 Which of the following serves as a continual activator of CD4+ T cells ?

Harrison's 18th Ed. 1525

- A. HIV replication in GALT
- B. HIV replication in blood
- C. Trapped HIV virus
- D. All of the above

Persistence of trapped virus after the transition from acute to chronic infection reflects a steady state whereby trapped virus turns over and is replaced by fresh virions, which are continually produced to a greater or lesser degree in individual patients. The trapped virus, either as whole virion or shed envelope, serves as a continual activator of CD4+ T cells, thus driving further virus replication.

209 Trapping of HIV is best related to which of the following ?

Harrison's 18th Ed. 1525

- A. Monocytes
- B. Macrophages
- C. Follicular dendritic cells (FDCs)
- D. All of the above

In follicular or germinal centers of lymph nodes, extracellular virions are trapped on follicular dendritic cells (FDCs) which form a fine network of long, fingerlike processes that envelop lymphocytes in the germinal center.

210 Which of the following help follicular dendritic cells trap HIV ?

Harrison's 18th Ed. 1525

- A. Interleukin β (IL-1 β)
- B. Tumor necrosis factor α (TNF- α)
- C. Complement
- D. All of the above

In follicular or germinal centers of the lymph nodes, virions that have bound complement components on their surfaces attach to the surface of FDCs via interactions with complement receptors.

211 In HIV infection, the trapped virions serve as ?

Harrison's 18th Ed. 1525

- A. Secretion of Interleukin β
- B. Secretion of Interleukin -6
- C. Secretion of Tumor necrosis factor α
- D. All of the above

In HIV infection, trapped virions serve as a persistent source of cellular activation, resulting in secretion of proinflammatory cytokines such as interleukin-1 β , tumor necrosis factor- α and IL-6 which upregulate virus replication in infected cells.

212 As the HIV disease progresses, which of the following events happen ?

Harrison's 18th Ed. 1525

- A. Germinal centers of lymph nodes disrupt
- B. Trapping efficiency of lymphoid tissue diminishes
- C. FDCs undergo cell death
- D. All of the above

As HIV disease progresses, architecture of germinal centers lymph nodes show disruption and eventually get "burnt out", trapping efficiency of lymphoid tissue diminishes & FDCs undergo cell death.

213 Which of the following is false regarding activation of immune system in HIV infection ?

Harrison's 18th Ed. 1526

- A. Chronically activated immune system
- B. Aberrantly activated immune system
- C. Lymph node hyperplasia in later course of disease

- D. Secretion of proinflammatory & immunoregulatory cytokines

Lymph node hyperplasia occurs particularly early in the course of disease.

214 Which of the following can enhance cellular activation and HIV replication ?

Harrison's 18th Ed. 1526

- A. Epstein-Barr virus (EBV)
- B. Cytomegalovirus (CMV)
- C. HBV
- D. All of the above

Co-infection with HSV types 1 and 2, cytomegalovirus (CMV), human herpesvirus (HHV) 6, Epstein-Barr virus (EBV), HBV, adenovirus, and HTLV-I upregulates HIV expression. Infestation with nematodes is associated with a heightened state of immune activation that facilitates HIV replication, therefore deworming of the infected host results in a decrease in plasma viremia.

215 Which is the most common opportunistic infection in HIV-infected individuals ?

Harrison's 18th Ed. 1526

- A. Malaria
- B. Mycobacterium tuberculosis
- C. HSV types 1 and 2
- D. Infestation with nematodes

Globally, Mycobacterium tuberculosis is probably the most common opportunistic infection in HIV-infected individuals.

216 HIV viral gene products associated with enhanced susceptibility to apoptosis include ?

Harrison's 18th Ed. 1527

- A. Env
- B. Tat
- C. Vpr
- D. All of the above

HIV viral gene products associated with enhanced susceptibility to apoptosis include Env, Tat & Vpr.

217 HIV viral gene products associated with enhanced susceptibility to apoptosis include all except ?

Harrison's 18th Ed. 1527

- A. Env
- B. Tat
- C. Vpr
- D. Nef

Nef has been shown to possess antiapoptotic properties.

218 In HIV infection, apoptosis is seen in ?

Harrison's 18th Ed. 1527

- A. CD4+ T cells
- B. CD8+ T cells
- B. B cells
- D. All of the above

In HIV infection, apoptosis is seen in "bystander" cells such as CD8+ T cells and B cells as well as in CD4+ T cells.

219 Immune reconstitution inflammatory syndrome (IRIS) is an ?

Harrison's 18th Ed. 1527

- A. Autoimmune-like phenomenon
- B. Autoimmune phenomenon

- C. Apoptotic phenomenon
- D. Any of the above

IRIS is an autoimmune-like phenomenon characterized by paradoxical deterioration of preexisting, untreated or partially treated opportunistic infections occurs in individuals started on ARV therapy. Viral load decreases with increases in CD4+ T cell counts.

220 IRIS is most common in patients starting ARV therapy with CD4+ T cell counts ?

Harrison's 18th Ed. 1556

- A. < 50 cells / μ L
- B. < 100 cells / μ L
- C. < 200 cells / μ L
- D. < 350 cells / μ L

Immune reconstitution inflammatory syndrome (IRIS) is most common in patients starting ARV therapy with CD4+ T cell counts < 50 cells / μ L.

221 Presentation of IRIS includes all except ?

Harrison's 18th Ed. 1556

- A. Pulmonary infiltrates
- B. Increased intracranial pressure
- C. Uveitis
- D. Hypothyroidism

IRIS may present anywhere from 2 weeks to 2 years after initiation of HAART and can include localized lymphadenitis, prolonged fever, pulmonary infiltrates, increased intracranial pressure, uveitis, and Graves' disease.

222 Underlying mechanism of IRIS is a phenomenon similar to ?

Harrison's 18th Ed. 1556

- A. Type I hypersensitivity reactions
- B. Type II hypersensitivity reactions
- C. Type III hypersensitivity reactions
- D. Type IV hypersensitivity reactions

Underlying mechanism of IRIS is a phenomenon similar to type IV hypersensitivity reactions.

223 Chemokines are ?

N Engl J Med 2006;354:610-21

- A. Heparin binding proteins
- B. Albumin binding proteins
- C. Globulin binding proteins
- D. Free proteins

224 Which is the largest family of chemotactic cytokines or chemokines ?

N Engl J Med 2006;354:610-21

- A. CC chemokines
- B. CXC chemokines
- C. CX₃C chemokines
- D. XCL1 chemokine

225 Which of the following is a CC chemokine ?

Harrison's 18th Ed. 1528

- A. Macrophage inflammatory protein (MIP)-1 α
- B. Macrophage inflammatory protein (MIP)-1 β
- C. RANTES
- D. All of the above

CC-chemokines macrophage inflammatory protein (MIP)-1 α (CCL3), MIP-1 β (CCL4) & RANTES (CCL5) inhibit infection by and spread of R5 HIV-1 strains. They are the natural ligands for CCR5.

226 Which of the following cytokines are consistent & potent inducers of HIV expression ?

Harrison's 18th Ed. 1528

- A. TNF-alpha
- B. IL-1beta
- C. IL-6
- D. All of the above

Proinflammatory cytokines TNF-alpha, IL-1beta, and IL-6 are the most consistent & potent inducers of HIV expression. Other cytokines that induce HIV expression include IL-1, IL-2, IL-3, IL-6, IL-12, TNF-alpha, TNF-beta, macrophage colony-stimulating factor (M-CSF), and granulocyte-macrophage colony-stimulating factor (GM-CSF).

227 Which of the following cytokines suppress HIV replication ?

Harrison's 18th Ed. 1528

- A. Interferon-alpha
- B. TNF-alpha
- C. IL-1beta
- D. IL-6

Interferon-alpha and -beta suppress HIV replication, whereas transforming growth factor-beta (TGF-beta), IL-4, IL-10 & IFN-gamma can either induce or suppress HIV expression, depending on the system involved.

228 Which of the following has a HIV-inducing effect at viral transcription level in NF-kB-independent manner ?

Harrison's 18th Ed. 1528

- A. TNF-alpha
- B. IL-beta
- C. IL-6
- D. IFN-gamma

HIV-inducing effect of IL-beta occurs at viral transcription level in an NF-kB-independent manner. TNF-alpha, which activates NF-kB proteins that function as transcriptional activators of HIV expression. IL-6, GM-CSF and IFN-gamma regulate HIV expression mainly by posttranscriptional mechanisms.

229 SDF stands for ?

Harrison's 18th Ed. 1528

- A. Stromal cell dependent factor
- B. Stromal cell derived factor
- C. Stromal cell deficient factor
- D. Stromal cell dominant factor

Stromal cell derived factor (SDF) 1 inhibits infection by & spread of X4 strains by blocking the binding of the HIV virus to its co-receptor CXCR4. SDF-1 is the natural ligand for CXCR4.

230 RANTES stands for ?

N Engl J Med 1998;338:438

- A. Regulated upon activation normal T-cell expressed & secreted
- B. Released upon activation normal T-cell expressed & secreted
- C. Reduced upon activation normal T-cell expressed & secreted
- D. Receptor upon activation normal T-cell expressed & secreted

CC-chemokines RANTES (CCL5), MIP-1 (CCL3), and MIP-1 (CCL4) inhibit infection of R5 strains of HIV by blocking the binding of HIV virus to its co-receptors, the CC-chemokine receptor CCR5.

231 Which of the following cytokine inhibits both R5 and X4 strains of HIV virus ?

Harrison's 18th Ed. 1528

- A. RANTES
- B. SDF-1
- C. Alpha defensin

D. All of the above

The alpha defensin family of cytokines inhibits both R5 and X4 viruses.

232 Which of the following is not a family of chemotactic cytokines or chemokines ?

N Engl J Med 2006;354:610-21

- A. CC chemokines
- B. CXC chemokines
- C. CX₂C chemokines
- D. CX₃C chemokine

233 Interleukin-8 is the prototype member of which chemokine family ?

N Engl J Med 2006;354:610-21

- A. CC
- B. CXC
- C. CX₃C
- D. XCL1

234 Fractalkine is a member of which chemokine family ?

N Engl J Med 2006;354:610-21

- A. CC chemokines
- B. CXC chemokines
- C. CX₃C chemokines
- D. XCL1 chemokine

235 Lymphotactin is a member of which chemokine family ?

N Engl J Med 2006;354:610-21

- A. CC chemokines
- B. CXC chemokines
- C. CX₃C chemokines
- D. XCL1 chemokine

236 HLA complex is located on ?

Harrison's 18th Ed. 2685

- A. Chromosome 3
- B. Chromosome 6
- C. Chromosome 9
- D. Chromosome 12

Human major histocompatibility complex (MHC), also called human leukocyte antigen (HLA) complex, is a 4-megabase (Mb) region on chromosome 6 (6p21.3). It is densely packed with expressed genes of which the best known are HLA class I & class II genes, whose products are critical for immunologic specificity & transplantation histocompatibility.

237 In WHO nomenclature, HLA class I alleles are given a single designation that indicates ?

Harrison's 18th Ed. 2686

- A. Locus
- B. Serologic specificity
- C. Sequence-based subtype
- D. All of the above

238 The original name of CXCR4 was ?

N Engl J Med 2004;350:1872-80

- A. Fusin
- B. Inhibin

C. Integrin

D. Catalin

239 Which of the following is called syncytium-inducing HIV virus ?

Harrison's 16th Ed. 1092

- A. R5 virus
- B. X4 virus
- C. R5X4 virus
- D. All of the above

240 In HIV, increased turnover of which lymphocyte is seen ?

Harrison's 18th Ed. 1528

- A. CD4+ T lymphocytes
- B. CD8+ T lymphocytes
- C. B lymphocytes
- D. All of the above

241 TRECs refer to ?

Harrison's 18th Ed. 1528

- A. T cell receptor emptying circles
- B. T cell receptor excision cycles
- C. T cell receptor excision circles
- D. T cell receptor emptying cycles

T cell receptor excision circles (TRECs) are a byproduct of T cell development & represent episomal fragments of DNA that are excised during T cell receptor gene rearrangement. TRECs increase following initiation of ARV therapy.

242 Strains of HIV that utilize CCR5 as a co-receptor are called ?

Harrison's 18th Ed. 1528

- A. CCR5 viruses
- B. CR5 viruses
- C. R5 viruses
- D. All of the above

HIV-1 utilizes two major co-receptors along with CD4 to bind to, fuse with, and enter target cells. These co-receptors are CCR5 and CXCR4. Strains of HIV that utilize CCR5 as a co-receptor are referred to as R5 viruses.

243 Strains of HIV that utilize CXCR4 as a co-receptor are called ?

Harrison's 18th Ed. 1528

- A. R4 viruses
- B. CR4 viruses
- C. XCR4 viruses
- D. X4 viruses

Strains of HIV that utilize CXCR4 are referred to as X4 viruses.

244 Strains of HIV that utilize both CCR5 and CXCR4 as co-receptors are referred to as ?

Harrison's 18th Ed. 1528

- A. R5X4 viruses
- B. X4R5 viruses
- C. 5R4X viruses
- D. R54X viruses

HIV virus strains that utilize both CCR5 and CXCR4 are referred to as R5X4 viruses.

245 Which of the following is the transmitting strain of HIV ?

Harrison's 18th Ed. 1528

- A. R5 virus

- B. X4 virus
- C. R5X4 virus
- D. All of the above

Transmitting virus is almost invariably an R5 virus that predominates during early stages of HIV disease.

246

In what percentage of HIV-infected individuals, there is a transition from R5 to X4 virus ?

Harrison's 18th Ed. 1528

- A. ~ 20 %
- B. ~ 40 %
- C. ~ 60 %
- D. ~ 80 %

In ~40% of HIV-infected individuals, there is a transition to a predominantly X4 virus that is associated with a relatively rapid progression of disease.

247

Which of the following subtypes, or clades of HIV-1 M group virus almost never switch from CCR5 to CXCR4 tropism ?

Harrison's 18th Ed. 1528

- A. A
- B. B
- C. C
- D. D

C subtypes, or clades of HIV-1 M group viruses almost never switch from CCR5 to CXCR4 tropism.

248

The natural chemokine ligands for HIV co-receptor CCR5 are all except ?

Harrison's 18th Ed. 1529 Figure 189-25

- A. RANTES (CCL5)
- B. MIP-1alpha (CCL3)
- C. MIP-1beta (CCL4)
- D. SDF-1

The natural chemokine ligands for HIV co-receptor CCR5 are the CC-chemokines RANTES (CCL5), MIP-1alpha (CCL3), and MIP-1beta (CCL4). They block entry of R5 viruses.

249

Natural chemokine ligands for HIV co-receptor CXCR4 is ?

Harrison's 18th Ed. 1529 Figure 189-25

- A. RANTES (CCL5)
- B. MIP-1alpha (CCL3)
- C. MIP-1beta (CCL4)
- D. SDF-1

SDF-1 is the natural ligand for CXCR4. It blocks the entry of X4 viruses.

250

Which of the following is also a co-receptors for HIV ?

Harrison's 17th Ed. 1157

- A. CCR2
- B. CCR3
- C. GPR1
- D. All of the above

Apart from CCR5 and CXCR4, other co-receptors for HIV entry also include CCR3, BOB/GPR15, CXCR6 (Bonzo/STRL33/TYMSTR), CCR2, CCR8, CX₃CR1(V28) and GPR1.

251

Which of the following is the macrophage-tropic strain of HIV ?

Harrison's 18th Ed. 1537

- A. R5 virus

- B. X4 virus
- C. R5X4 virus
- D. All of the above

R5 is the macrophage-tropic strains of HIV. They are more efficient in infecting monocytes/macrophages & microglial cells of brain.

252

Individuals with which of the following are protected against HIV infection ?

Harrison's 18th Ed. 1534

- A. Homozygous for CCR5-32 deletion
- B. Heterozygous for the CCR2-64I mutation
- C. RANTES-28G mutation
- D. All of the above

253

One of the first immune defects detected in HIV disease is ?

Harrison's 18th Ed. 1529

- A. Defective T cell cloning & colony-forming efficiencies
- B. Decreased IFN-γ production in response to antigens
- C. Defect in response to remote recall antigens
- D. Response to mitogenic stimulation

One of the first abnormalities to be detected is a defect in response to remote recall antigens, such as tetanus toxoid and influenza.

254

Which of the following is a major co-stimulatory molecule necessary for the normal activation of T cells ?

Harrison's 18th Ed. 1529

- A. CD20
- B. CD28
- C. CD38
- D. CD45RO

CD28 is a major co-stimulatory molecule necessary for the normal activation of T cells. It is expressed by CD4+ T cells and is reduced during HIV infection.

255

Markers of terminal activation include ?

Harrison's 18th Ed. 1529

- A. HLA-DR
- B. CD38
- C. CD45RO
- D. All of the above

CD4+ T cells lacking expression of CD28 do not respond normally to activation signals and may express markers of terminal activation including HLA-DR, CD38, and CD45RO.

256

Which of the following contribute to the dysregulation of B cell function seen in HIV disease ?

Harrison's 18th Ed. 1529

- A. CD20 ligand
- B. CD40 ligand
- C. CD60 ligand
- D. CD80 ligand

CD4+ T cells from HIV-infected individuals express abnormally low levels of CD40 ligand which may contribute to dysregulation of B cell function.

257

T-regs refers to ?

Harrison's 18th Ed. 1529

- A. T regulatory cells
- B. T registry cells

- C. T regenerating cells
- D. T recognizing cells

T-regs refers to T regulatory cells that are involved in dampening aberrant immune activation that propagates HIV replication. Presence of these T-reg cells correlates with lower viral loads and higher CD4+/CD8+ T cell ratios.

258 Which cells constitute a long-term reservoir of potentially infectious virus ?

N Engl J Med 2004;350:1872-80

- A. CD8+ T cells
- B. CD4+ T cells
- C. B Lymphocyte
- D. Macrophage

259 Predominantly infected cell population in HIV infection is ?

N Engl J Med 2004;350:1872-80

- A. Memory CD4+ T cells
- B. Naive CD4+ T cells
- C. Proliferating CD4+ T cells
- D. Activated CD4+ T cells

A significant percentage of CD4+ T cells (particularly memory cells) in the gut-associated lymphoid tissue (GALT) is depleted early after infection.

260 HIV replicates most efficiently in ?

N Engl J Med 2004;350:1872-80

- A. Memory CD4+ T cells
- B. Naive CD4+ T cells
- C. Proliferating CD4+ T cells
- D. Activated CD4+ T cells

HIV preferentially infects activated CD4+ T cells including HIV-specific CD4+ T cells.

261 Pool of infected quiescent T cells called "latent reservoir" is formed by ?

N Engl J Med 2004;350:1872-80

- A. CD4+ T-cell
- B. CD8+ T-cell
- C. B Lymphocyte
- D. Macrophage

262 ADCC refers to ?

Harrison's 18th Ed. 1536 Figure 189-26

- A. Antibody-dependent cellular cytotoxicity
- B. Antigen-dependent cellular cytotoxicity
- C. Antibody-derived cellular cytotoxicity
- D. Antigen-derived cellular cytotoxicity

Anti-MHC class II antibodies in HIV infection can lead to elimination of MHC class II bearing cells via antibody-dependent cellular cytotoxicity (ADCC). ADCC involves the killing of HIV-expressing cells by NK cells armed with specific antibodies directed against HIV antigens.

263 Strain differences in single-cell killing are determined by ?

Harrison's 17th Ed. 1158

- A. gp41 sequences
- B. gp120 sequences
- C. gp160 sequences
- D. All of the above

Strain differences in single-cell killing are determined largely by gp120 sequences.

264 Which of the following relate to bystander killing ?

Harrison's 18th Ed. 1537

- A. Anti-gp120 antibodies
- B. Uninfected CD4+ T cells
- C. Free gp120
- D. All of the above

Anti-gp120 antibodies that participate in ADCC killing of HIV-infected cells might also kill uninfected CD4+ T cells if uninfected cells had bound free gp120. This phenomenon is called bystander killing.

265 HIV infected individuals whose CD8+ T cells developed which phenotype after seroconversion have a more aggressive course and a poorer prognosis ?

Harrison's 18th Ed. 1530

- A. HLA-DR+/CD38+
- B. HLA-DR+/CD38-
- C. HLA-DR-/CD38+
- D. HLA-DR-/CD38-

HIV infected individuals whose CD8+ T cells developed a phenotype of HLA-DR+/CD38- following seroconversion had stabilization of their CD4+ T cell counts, whereas those whose CD8+ T cells developed a phenotype of HLA-DR+/CD38+ had a more aggressive course and a poorer prognosis.

266 The main cell type infected with HIV in the brain is ?

Harrison's 18th Ed. 1534

- A. Oligodendrocytes
- B. Neurons
- C. Microglial cells
- D. Astrocytes

Main cell types infected by HIV in brain in vivo are perivascular macrophages & the microglial cells.

267 Elevated levels of which of the following in the brain & CSF correlate best with the presence & degree of HIV encephalopathy ?

Harrison's 18th Ed. 1535

- A. Vasoactive intestinal peptide (VIP)
- B. Monocyte chemotactic protein (MCP)1
- C. IL-1
- D. All of the above

Elevated levels of monocyte chemotactic protein (MCP)1 in the brain and CSF correlate best with the presence and degree of HIV encephalopathy.

268 Moritz Kaposi had which nationality ?

N Engl J Med 2000;342:1027

- A. German
- B. Italian
- C. Hungarian
- D. Polish

Moritz Kaposi was a Hungarian dermatologist (1872).

269 Which of the following variant of Kaposi's sarcoma is AIDS associated ?

N Engl J Med 2000;342:1027

- A. Classic
- B. Endemic
- C. Immunosuppression or transplantation-associated
- D. Epidemic

Epidemic Kaposi's sarcoma is AIDS associated.

270 Which of the following does not belong to the Herpesviridae family ?

Harrison's 18th Ed. 1433 Table 177-1

- A. Varicella-zoster virus
- B. Epstein-Barr virus
- C. Coxsackievirus
- D. Cytomegalovirus

Coxsackievirus belongs to Picornaviridae family of RNA viruses. Varicella-zoster virus, Epstein-Barr virus, and Cytomegalovirus are also called human herpesvirus (HHV) 3, 4 and 5 respectively.

271 Colour of papules & plaques seen in Kaposi's sarcoma is ?

Harrison's 18th Ed. 1564

- A. Purple
- B. Black
- C. Brown
- D. Yellow

Purple-colored papules and plaques are seen in Kaposi's sarcoma.

272 Which of the following best relates to Kaposi's sarcoma ?

Harrison's 18th Ed. 1564

- A. Herpes simplex virus
- B. Helicobacter pylori
- C. Human herpes virus 8 (HHV-8)
- D. Cytomegalovirus

Human herpesvirus type 8 is believed to be the cause of most cases of Kaposi's sarcoma.

273 Kaposi's sarcoma-associated herpesvirus (KSHV) is the other name of ?

Harrison's 18th Ed. 1564

- A. Human herpes virus 6 (HHV-6)
- B. Human herpes virus 7 (HHV-7)
- C. Human herpes virus 8 (HHV-8)
- D. All of the above

HHV-8 is also referred to as Kaposi's sarcoma-associated herpesvirus (KSHV).

274 Human herpes virus 8 (HHV-8) is related to ?

Harrison's 18th Ed. 1535

- A. Cytomegalovirus
- B. Epstein-Barr virus (EBV)
- C. Herpes simplex virus
- D. Varicella-zoster virus

HHV-8 is a γ -herpesvirus related to EBV and herpesvirus saimiri.

275 Kaposi's sarcoma (KS) is a ?

Harrison's 18th Ed. 1535

- A. Neoplastic sarcoma
- B. Lymphoproliferative disease
- C. Angioproliferative disease
- D. Granulomatous disease

KS is an angioproliferative disease and not a true neoplastic sarcoma, at least not in its early stages.

276 Human herpes virus 8 (HHV-8) causes ?

Harrison's 18th Ed. 1535

- A. Body cavity lymphoma

- B. Multiple myeloma
- C. Monoclonal gammopathy of undetermined significance
- D. All of the above

HHV-8, in addition to KS, can cause body cavity lymphoma, multiple myeloma and monoclonal gammopathy of undetermined significance.

277 Multiple vascular nodules in Kaposi's sarcoma appear in ?

Harrison's 18th Ed. 1564

- A. Skin
- B. Mucous membranes
- C. Viscera
- D. All of the above

Kaposi's sarcoma is a multicentric neoplasm consisting of multiple vascular nodules appearing in skin, mucous membranes, and viscera. Lesions can occur in virtually every organ, but lymph nodes, GI tract and lung are most commonly affected by KS.

278 Which of the following about Kaposi's sarcoma is false ?

Harrison's 18th Ed. 1564

- A. May appear at any stage of HIV infection
- B. Koebner phenomenon +
- C. Initial lesion may be a swollen lymph node
- D. None of the above

Clinically, KS may present at any stage of HIV infection, even with normal CD4+ T cell count. Initial lesion may be a reddish-purple skin nodule in sun-exposed areas with tendency to occur in areas of trauma (Koebner phenomenon), discoloration on oral mucosa, or a swollen lymph node (a marker of good prognosis).

279 In KS, histologically which of the following cells proliferate ?

Harrison's 18th Ed. 1565

- A. Sebaceous cells
- B. Spindle cells
- C. Epidermal cells
- D. All of the above

Histologically, in KS, proliferation of spindle cells & endothelial cells, extravasation of RBCs, & hemosiderin-laden macrophages are seen.

280 Differential diagnosis of KS includes ?

Harrison's 18th Ed. 1565

- A. Lymphoma
- B. Bacillary angiomatosis
- C. Cutaneous mycobacterial infections
- D. All of the above

281 Which of the following is used in the treatment of KS ?

Harrison's 18th Ed. 1565

- A. Vinblastine
- B. IFN- α
- C. Liposomal daunorubicin
- D. All of the above

IFN- α has ARV activity. Besides the above three, liposomal doxorubicin & paclitaxel are also useful.

282 Antibodies to HIV almost invariably appear within how many weeks of primary infection ?

Harrison's 18th Ed. 1536

- A. 2
- B. 8

- C. 12
- D. 16

Antibodies to HIV usually appear within 6 weeks & almost invariably within 12 weeks of primary infection.

283 The first HIV antibodies detected is directed against ?

Harrison's 18th Ed. 1536

- A. p17
- B. p24
- C. p55
- D. gp41

First antibodies detected in HIV are those directed against the immunodominant region of envelope gp41, followed by antibodies to structural or gag protein p24 and gag precursor p55. Antibodies to p24 gag are followed by antibodies to outer envelope glycoprotein (gp120), the gag protein p17, and the products of the pol gene (p31 and p66).

284 Which of the following is the product of pol gene ?

Harrison's 18th Ed. 1536

- A. p31
- B. p51
- C. p66
- D. All of the above

The products of the pol gene are p31, p51 and p66.

285 Which of the following is an envelope protein of HIV ?

Harrison's 18th Ed. 1536

- A. gp160
- B. gp120
- C. gp41
- D. All of the above

Envelope proteins of HIV are gp160, gp120, p88 and gp41.

286 Low-molecular-weight regulatory proteins encoded by the HIV genes include ?

Harrison's 18th Ed. 1536

- A. vpr
- B. tat
- C. nef
- D. All of the above

Low-molecular-weight regulatory proteins encoded by HIV genes include vpr, vpu, vif, rev, tat & nef.

287 HIV viral protein that elicit neutralizing antibody is ?

Harrison's 18th Ed. 1536

- A. p17
- B. p24
- C. p55
- D. gp41

The only HIV viral proteins that elicit neutralizing antibodies are envelope proteins gp120 & gp41.

288 The HIV envelope glycoproteins gp120 and gp41 are derived from a precursor with a molecular mass of ?

Harrison's 17th Ed. 1163

- A. 160-kDa
- B. 161-kDa
- C. 162-kDa

- D. 163-kDa

The envelope of HIV consists of an outer envelope glycoprotein with a molecular mass of 120 kDa and a transmembrane glycoprotein with a molecular mass of 41 kDa. These are initially synthesized as a 160-kDa precursor that is cleaved by cellular proteases.

289 V3 loop region is present in ?

Harrison's 18th Ed. 1536

- A. gp20
- B. gp41
- C. gp120
- D. gp160

Antienvelope antibodies are directed toward gp41 (amino acids 579 - 613 region) or toward a hypervariable region in gp120 molecule known as V3 loop region (amino acids 303 - 338). V3 region is a major site for the development of mutations that lead to variants of HIV. Type-specific neutralizing antibodies are directed to the V3 loop region.

290 Mechanism of immune escape of HIV infection from initial neutralizing antibodies is ?

Harrison's 18th Ed. 1536

- A. Hyperamination of envelope protein
- B. Hypersulphation of envelope protein
- C. Hyperphosphorylation of envelope protein
- D. Hyperglycosylation of envelope protein

Within first 6 months of HIV infection neutralizing antibodies appear. But, HIV escapes these neutralizing antibodies by addition of carbohydrate moieties that interfere with envelope recognition by neutralizing antibodies. Hyperglycosylation of envelope protein is termed as the glycan shield.

291 "Opsonize" in Greek means ?

Harrison's 16th Ed. 698

- A. To swell
- B. To destroy
- C. To prepare for eating
- D. To be deformed

292 Nucleic acid testing can detect HIV infection within ?

Harrison's 18th Ed. 1538

- A. 6 days
- B. 12 days
- C. 18 days
- D. 22 days

The interval between HIV infection & detection (window period) is 22 days for antibody testing, 16 days with p24 antigen testing and 12 days with nucleic acid testing.

293 Factor associated with false-positive enzyme immunoassay (EIA) tests is ?

Harrison's 18th Ed. 1538

- A. Hepatic disease
- B. Recent influenza vaccination
- C. Acute viral infections
- D. All of the above

Factors associated with false-positive EIA tests are antibodies to class II antigens, autoantibodies, hepatic disease, recent influenza vaccination, and acute viral infections.

294 Western blot demonstrating antibodies to which of the major genes of HIV is conclusive evidence of HIV infection ?

Harrison's 18th Ed. 1538

- A. gag
- B. pol

- C. env
- D. All of the above

Western blot demonstrating antibodies to products of all three of the major genes of HIV (gag, pol, and env) is conclusive evidence of infection with HIV.

295

Criteria by US FDA for a positive Western blot is if antibodies exist against ?

Harrison's 18th Ed. 1538

- A. p24 and gp41
- B. p24 and gp120/160
- C. gp41 and gp120/160
- D. Any of the above

Criteria established by the US FDA for a positive Western blot state that a result is considered positive if antibodies exist to two of the three HIV proteins: p24, gp41 and gp120/160.

296

When found indeterminate, Western blot should be repeated after how much time ?

Harrison's 18th Ed. 1538

- A. 1 month
- B. 2 months
- C. 3 months
- D. 6 months

Western blot should be repeated in 1 month to determine whether or not the indeterminate pattern is a pattern in evolution.

297

OraQuick Rapid HIV-1 antibody test can be done with ?

Harrison's 18th Ed. 1538

- A. Blood
- B. Plasma
- C. Saliva
- D. All of the above

OraQuick Rapid HIV-1 antibody test can be done on blood, plasma or saliva.

298

In Western Blot, absence of which of the following band raises suspicion that it may a false-positive test result ?

Harrison's 18th Ed. 1538

- A. p 31
- B. p 32
- C. p 33
- D. p 34

In Western Blot, absence of the p31 band (pol gene product) should raise suspicion that it may be a false-positive test result.

299

Test for direct detection of HIV is ?

Harrison's 18th Ed. 1540 Table 189-7

- A. Immune complex dissociated p24 antigen capture assay
- B. HIV RNA by bDNA
- C. HIV RNA by NASBA
- D. All of the above

Tests for direct detection of HIV are Immune complex dissociated p24 antigen capture assay, HIV RNA by PCR, HIV RNA by bDNA and HIV RNA by NASBA.

300

Test that measure HIV RNA in plasma of patients with HIV infection is ?

Harrison's 18th Ed. 1540

- A. Reverse transcriptase PCR (RT-PCR)

- B. Branched DNA (bDNA)
- C. Nucleic acid sequence based amplification (NASBA)
- D. All of the above

Commercially available tests that measure HIV RNA in plasma of patients with HIV infection are reverse transcriptase PCR (RT-PCR), branched DNA (bDNA), and nucleic acid sequence based amplification (NASBA). DNA PCR is used by research laboratories.

301

"Gold standard" for the diagnosis of HIV infection is ?

Harrison's 18th Ed. 1540

- A. EIA
- B. Western blot
- C. EIA with Western blot
- D. Immune complex dissociated p24 antigen capture assay

A positive EIA with a confirmatory Western blot is the "gold standard" for diagnosis of HIV infection.

302

Patients with CD4+ T cell counts <200/μL are at high risk of disease from ?

Harrison's 18th Ed. 1541

- A. Herpes simplex virus infection (HSV)
- B. Herpes zoster
- C. Candidal esophagitis
- D. P. jiroveci

Patients with CD4+ counts <200/μL are at high risk of disease from P. jiroveci and should start prophylaxis treatment.

303

Patients with CD4+ T cell counts <50/μL are at high risk of disease from ?

Harrison's 18th Ed. 1541

- A. CMV
- B. Mycobacteria of M. avium complex (MAC)
- C. T. gondii
- D. All of the above

Patients with CD4+ T cell counts <50/μL are at high risk of disease from CMV, mycobacteria of the M. avium complex (MAC) and/or T. gondii and should start prophylaxis treatment.

304

Patients with HIV infection should have CD4+ T cell measurements at the time of diagnosis and ?

Harrison's 18th Ed. 1541

- A. Every week
- B. Every fortnight
- C. Every month
- D. Every 3 - 6 months

Patients with HIV infection should have CD4+ T cell measurements performed at the time of diagnosis and every 3 - 6 months thereafter.

305

What level of CD4 T cell count is an indication for consideration of initiating ARV therapy ?

Harrison's 18th Ed. 1541

- A. < 500 / μL
- B. < 450 / μL
- C. < 400 / μL
- D. < 350 / μL

CD4 T cell count <350/μL is an indication for consideration of initiating ARV therapy

306 What percentage of decline in CD4+ T cell count is an indication for considering a change in therapy ?

Harrison's 18th Ed. 1541

- A. > 5 %
- B. > 10 %
- C. > 15 %
- D. > 25 %

A decline in CD4+ T cell count of >25% is an indication for considering a change in therapy.

307 What percent of CD4+ T cell is comparable to a CD4+ T cell count of 200/ μ L ?

Harrison's 18th Ed. 1541

- A. 5 %
- B. 10 %
- C. 15 %
- D. 20 %

A CD4+ T cell percent of 15 is comparable to a CD4+ T cell count of 200/ μ L.

308 ARV therapy is considered in patients with how many copies of HIV RNA per milliliter ?

Harrison's 17th Ed. 1168

- A. > 1000
- B. > 10000
- C. > 50000
- D. > 100000

ARV therapy is considered in patients with >100,000 copies of HIV RNA per milliliter.

309 Following initiation / change in ARV therapy, plasma HIV RNA levels should be monitored every ?

Harrison's 18th Ed. 1542

- A. 1 week
- B. 2 weeks
- C. 4 weeks
- D. 8 weeks

Following initiation / change in ARV therapy, plasma HIV RNA levels should be monitored every 4 weeks till a new steady-state level of HIV RNA appears.

310 During ARV therapy, plasma HIV RNA levels should be monitored every ?

Harrison's 18th Ed. 1542

- A. Month
- B. 2 months
- C. 3 months
- D. 6 months

During therapy, levels of HIV RNA should be monitored every 3 - 4 months to evaluate the continuing effectiveness of therapy.

311 Effective ARV therapy implies a plasma HIV RNA level of ?

Harrison's 18th Ed. 1543

- A. < 350 copies per milliliter
- B. < 200 copies per milliliter
- C. < 100 copies per milliliter
- D. < 50 copies per milliliter

Effective ARV therapy implies a plasma HIV RNA level of < 50 copies per milliliter. This level of virus is achieved within 6 months of the initiation of effective treatment.

312 Enfuvirtide binds to which glycoprotein to inhibit fusion of HIV with the target cell ?

N Engl J Med 2004;351

- A. Glycoprotein 24
- B. Glycoprotein 41
- C. Glycoprotein 120
- D. Glycoprotein 160

313 HIV virus with defect in which of the following gene may lead to "long-term nonprogressors" ?

Harrison's 18th Ed. 1537

- A. nef
- B. vif
- C. vpr
- D. vpu

Nef has been shown to possess antiapoptotic properties. Env, Tat, and Vpr enhance susceptibility to apoptosis.

314 Cleavage of the gag polyprotein produces three large proteins named ?

N Engl J Med 1998;338:1281

- A. p24, p17, and p27
- B. p24, p17, and p7
- C. p34, p17, and p7
- D. p24, p27, and p7

315 Antibodies to HIV appear almost invariably within how many weeks of primary infection ?

Harrison's 18th Ed. 1536

- A. 2 weeks
- B. 8 weeks
- C. 12 weeks
- D. 16 weeks

316 What percentage of HIV infected patients experience acute HIV syndrome ?

Harrison's 18th Ed. 1542

- A. 10 - 30 %
- B. 20 - 50 %
- C. 50 - 70 %
- D. 70 - 90 %

317 Acute HIV syndrome occurs how many weeks after primary infection ?

Harrison's 18th Ed. 1542

- A. < 1 week
- B. 1 - 2 weeks
- C. 2 - 3 weeks
- D. 3 - 6 weeks

50 - 70% of individuals with HIV infection experience an acute clinical syndrome ~3 - 6 weeks after primary infection which coincides with a burst of plasma viremia, persist for one to several weeks, features similar to those of acute infectious mononucleosis. It is less common in those infected by injection drug use than those infected by sexual contact.

318 Which of the following about acute HIV syndrome is false ?

Harrison's 18th Ed. 1542

- A. Presentation resembles acute infectious mononucleosis

- B. Opportunistic infections may occur
- C. ~70% develop lymphadenopathy
- D. None of the above

319 Median time from primary HIV infection to development of AIDS in untreated individuals in developed world is ?

Harrison's 18th Ed. 1542

- A. ~ 1 year
- B. ~ 5 years
- C. ~ 10 years
- D. ~ 15 years

Although variable, median length of time from initial infection to development of clinical disease for untreated patients is ~10 years.

320 During asymptomatic period of HIV infection, average rate of CD4+ T cell decline is ?

Harrison's 18th Ed. 1543

- A. ~ 50 / μ L per year
- B. ~ 75 / μ L per year
- C. ~ 100 / μ L per year
- D. ~ 125 / μ L per year

During asymptomatic period of HIV infection, average rate of CD4+ T cell decline is ~50/ μ L per year.

321 Immunodeficiency is severe enough when CD4+ T cell count falls to ?

Harrison's 18th Ed. 1543

- A. < 400 / μ L
- B. < 350 / μ L
- C. < 300 / μ L
- D. < 200 / μ L

When CD4+ T cell count falls to <200/ μ L, the resulting state of immunodeficiency is severe enough & severe & life-threatening complications (opportunistic infection & neoplasms) of HIV infection occur.

322 Average CD4+ T cell count of an HIV-infected patient at the time of death is ?

Harrison's 17th Ed. 1169

- A. ~ 50 cells / μ L
- B. ~ 100 cells / μ L
- C. ~ 200 cells / μ L
- D. ~ 300 cells / μ L

Average CD4+ T cell count of an HIV-infected patient at the time of death is just over 300 cells/ μ L.

323 Which of the following sinuses are most commonly involved in HIV infection ?

Harrison's 18th Ed. 1546

- A. Maxillary
- B. Ethmoid
- C. Sphenoid
- D. Frontal

Maxillary sinuses are most commonly involved in HIV infection. Disease is also frequently seen in ethmoid, sphenoid and frontal sinuses.

324 Most common cause of pneumonia in HIV infection is ?

Harrison's 18th Ed. 1547

- A. *Mycoplasma pneumoniae*

- B. *Klebsiella pneumoniae*
- C. *Streptococcus pneumoniae*
- D. *Chlamydia pneumoniae*

325 Most common cause of pneumonia in HIV infection is ?

Harrison's 18th Ed. 1547

- A. *Pseudomonas aeruginosa*
- B. *Staphylococcus aureus*
- C. *Haemophilus influenzae*
- D. *Neisseria meningitidis*

*In HIV/AIDS, pneumonia is caused most commonly by encapsulated organisms (*S. pneumoniae* & *H. influenzae*) & the unicellular fungus *P. jiroveci*.*

326 All patients of HIV infection must receive pneumocystis pneumonia prophylaxis when CD4+ T cell counts is ?

Harrison's 18th Ed. 1547

- A. < 300 / μ L
- B. < 200 / μ L
- C. < 100 / μ L
- D. < 50 / μ L

All patients of HIV infection must receive pneumocystis pneumonia (PCP) prophylaxis when their CD4+ T cell counts is < 200 / μ L or a CD4 % <15.

327 Treatment for PCP or disseminated pneumocystosis is ?

Harrison's 18th Ed. 1547

- A. Trimethoprim / sulfamethoxazole
- B. Dapsone / trimethoprim
- C. Clindamycin / primaquine
- D. All of the above

Treatment options for PCP or disseminated pneumocystosis are TMP/SMX, dapsone/trimethoprim & clindamycin/primaquine. IV pentamidine is the treatment of choice for severe disease.

328 Agents for prophylaxis for PCP include ?

Harrison's 18th Ed. 1547

- A. Dapsone + pyrimethamine + leucovorin
- B. Aerosolized pentamidine
- C. Atovaquone
- D. All of the above

For patients who cannot tolerate TMP/SMX, PCP prophylaxis include dapsone + pyrimethamine + leucovorin, aerosolized pentamidine and atovaquone.

329 Which of the following regarding TB in HIV patient is false ?

Harrison's 18th Ed. 1548

- A. HIV infection increases risk of active TB by 100x
- B. Rifabutin is substituted for rifampin in those receiving HIV protease inhibitors
- C. Rifabutin is substituted for rifampin in those receiving NNRTI's
- D. None of the above

HIV infection increases the risk of developing active TB by a factor of 100. Therapy for TB is generally the same in HIV-infected patient as in HIV-negative patient. Rifabutin should be substituted for rifampin in patients receiving HIV protease inhibitors or nonnucleoside reverse transcriptase inhibitors.

330 Runyon classification of Nontuberculous Mycobacteria (NTM) is based on ?

Harrison's 17th Ed. Chapter 160

- A. Colony number

- B. Colony size
- C. Colony shape
- D. Colony pigmentation

Runyon classification of Nontuberculous Mycobacteria (NTM) is based on colony pigmentation.

331 Which of the following is a rapidly growing NTM species ?

Harrison's 17th Ed. Chapter 160

- A. *M. avium*
- B. *M. kansasii*
- C. *M. fortuitum*
- D. *M. marinum*

*Rapidly growing NTM species are *M. abscessus*, *M. fortuitum*, and *M. chelonae*, while slow-growing species include *M. avium*, *M. kansasii*, *M. ulcerans*, and *M. marinum*.*

332 Therapy for MAC include all except ?

Harrison's 18th Ed. 1548

- A. Clarithromycin
- B. Ethambutol
- C. Pyrazinamide
- D. Rifabutin

Therapy for MAC is clarithromycin with ethambutol. Rifabutin, ciprofloxacin, or amikacin is added in patients with extensive disease.

333 Due primarily to HIV infection, which is the most common clinically significant cardiac finding ?

Harrison's 18th Ed. 1549

- A. Pericardial effusion
- B. Nonbacterial thrombotic endocarditis
- C. Left atrial myxoma
- D. Dilated cardiomyopathy

Due primarily to HIV infection, dilated cardiomyopathy with CHF (HIV-associated cardiomyopathy) is the most common clinically significant finding. The most common form of heart disease in HIV patients is coronary heart disease.

334 Oral lesions in HIV infection include ?

Harrison's 18th Ed. 1549

- A. Thrush
- B. Hairy leukoplakia
- C. Aphthous ulcers
- D. All of the above

*Oral lesions in HIV infection include thrush (*Candida*), hairy leukoplakia (EBV), and aphthous ulcers.*

335 Which of the following about oral hairy leukoplakia is false ?

Harrison's 18th Ed. 1549

- A. Found along lateral borders of tongue
- B. Not considered a premalignant condition
- C. Associated with florid replication of EBV
- D. None of the above

336 Esophagitis associated with a single large ulcer is typical of ?

Harrison's 18th Ed. 1550

- A. *Candida*
- B. CMV
- C. HSV

- D. KS

In HIV infection, esophagitis associated with a single large ulcer occurs in CMV infection, HSV infection is associated with multiple small ulcers.

337 Which of the following hepatitis virus infections are seen with increased frequency in patients with HIV infection ?

Harrison's 18th Ed. 1552

- A. Hepatitis A
- B. Hepatitis B
- C. Hepatitis C
- D. All of the above

Hepatitis A virus infection is not seen with an increased frequency in patients with HIV infection. Co-infection with hepatitis B, C, D, E, & G viruses is common.

338 HIV infection co-infected with which of the following virus has a decreased rate of progression to AIDS ?

Harrison's 18th Ed. 1552

- A. Hepatitis B virus
- B. Hepatitis C virus
- C. Hepatitis D virus
- D. Hepatitis G virus

Patients with HIV infection co-infected with hepatitis G virus have a decreased rate of progression to AIDS.

339 Which of the following drugs is used in the treatment of HIV and HBV co-infection ?

Harrison's 18th Ed. 1552

- A. Emtricitabine
- B. Adefovir / Tenofovir
- C. Entecavir
- D. All of the above

Lamivudine, emtricitabine, or adefovir/tenofovir and entecavir are used in the treatment of HIV and HBV co-infection.

340 A syndrome similar to Gilbert's syndrome appears with the use of which of the following ARV drug ?

Harrison's 18th Ed. 1553

- A. Nevirapine
- B. Indinavir
- C. Emtricitabine
- D. Tenofovir

Nevirapine is associated with fatal fulminant & cholestatic hepatitis, hepatic necrosis, & hepatic failure. Indinavir & atazanavir may cause mild - moderate elevations in serum bilirubin in a syndrome similar to Gilbert's syndrome.

341 Features of lipodystrophy in HIV patients receiving HAART are ?

Harrison's 18th Ed. 1553

- A. Increased plasma triglycerides
- B. Increased total cholesterol
- C. Increased apolipoprotein B
- D. All of the above

Features of lipodystrophy in HIV patients receiving HAART are elevations in plasma triglycerides, total cholesterol & apolipoprotein B, as well as hyperinsulinemia & hyperglycemia.

342 Which of the following ARV drug is a thymidine analogue ?

Harrison's 18th Ed. 1554

- A. Zidovudine

- B. Lamivudine
- C. Nevirapine
- D. Efavirenz

Zidovudine and Stavudine are thymidine analogues.

343 Most commonly used drug for lipodystrophy in HIV patients receiving HAART is ?

Harrison's 18th Ed. 1554

- A. Atorvastatin
- B. Cholestyramine
- C. Ezetimibe
- D. Nicotinic acid

Most commonly used drug for lipodystrophy in HIV patients receiving HAART is either gemfibrozil or atorvastatin. Others may cause drug interactions.

344 Persistent generalized lymphadenopathy is defined enlarged lymph nodes in two or more extrainguinal sites, without an obvious cause for ?

Harrison's 18th Ed. 1556

- A. > 1 month
- B. > 3 months
- C. > 6 months
- D. > 9 months

PGL is defined as presence of enlarged lymph nodes (>1 cm) in two or more extrainguinal sites for >3 months without an obvious cause.

345 Typical hematological laboratory finding in Zidovudine therapy is ?

Harrison's 18th Ed. 1556

- A. Reduced hematocrit
- B. Elevated mean corpuscular volume (MCV)
- C. Increased rouleaux formation
- D. All of the above

A characteristic feature of zidovudine therapy is an elevated mean corpuscular volume (MCV).

346 HIV-infected individuals with which of the following are at increased risk for AIDS encephalopathy & peripheral neuropathy ?

Harrison's 18th Ed. 1534 Table 189-5

- A. ApoA-I
- B. ApoB-100
- C. ApoE4 allele
- D. ApoJ

HIV-infected individuals with the E4 allele for apo E are at increased risk for AIDS encephalopathy and peripheral neuropathy.

347 During asymptomatic phase of HIV infection, CSF findings are abnormal in what percentage of patients ?

Harrison's 18th Ed. 1558

- A. ~ 25 %
- B. ~ 50 %
- C. ~ 70 %
- D. ~ 90 %

During asymptomatic phase of HIV infection, CSF findings are abnormal in ~ 90 % of patients

348 Which of the following is the most common CSF abnormality in HIV infection ?

Harrison's 18th Ed. 1558

- A. Pleocytosis
- B. Detection of viral RNA
- C. Elevated CSF protein
- D. Evidence of intrathecal synthesis of anti-HIV antibodies

CSF abnormalities in HIV infection include pleocytosis (50-65%), detection of viral RNA (~75%), elevated CSF protein (35%), and evidence of intrathecal synthesis of anti-HIV antibodies (90%).

349 Which of the following about aseptic meningitis in HIV infection is false ?

Harrison's 18th Ed. 1559

- A. VII cranial nerve most often involved
- B. Normal glucose level in CSF
- C. Resolves spontaneously within 2 - 4 weeks
- D. More common following development of AIDS

Aseptic meningitis in HIV infection is immune-mediated and is seen in any but the very late stages of HIV infection i.e. rare following development of AIDS.

350 Which of the following is included as an AIDS-defining condition ?

Harrison's 18th Ed. 1559

- A. AIDS dementia complex or HIV encephalopathy
- B. Cryptococcus neoformans meningitis
- C. Reactivation of Chagas' disease
- D. All of the above

351 Which of the following is included as an AIDS-defining condition ?

Harrison's 18th Ed. 1559

- A. Histoplasmosis
- B. Generalized wasting
- C. Invasive cervical cancer
- D. All of the above

352 Which of the following is uncommon in AIDS dementia complex ?

Harrison's 18th Ed. 1559

- A. Aphasia
- B. Apraxia
- C. Agnosia
- D. All of the above

In contrast to "cortical" dementia (Alzheimer's disease), aphasia, apraxia, and agnosia are uncommon in HIV encephalopathy, also called HIV-associated dementia or AIDS dementia complex. It is also called "subcortical dementia".

353 HIV encephalopathy or AIDS dementia complex is characterized by ?

Harrison's 18th Ed. 1559

- A. Dementia
- B. Motor abnormalities
- C. Behavioral abnormalities
- D. All of the above

Usually a late complication of HIV infection, AIDS dementia complex is characterized by dementia (subcortical), motor and behavioral abnormalities.

354 Which of the following is not a behavioral abnormality in HIV encephalopathy ?

Harrison's 18th Ed. 1559

- A. Apathy
- B. Significant changes in level of alertness
- C. State of agitation
- D. Mild mania

In contrast to dementia due to toxic/metabolic encephalopathies, significant changes in level of alertness are absent in HIV encephalopathy.

355 Etiologic agent of progressive multifocal leukoencephalopathy (PML) is ?

Harrison's 18th Ed. 1561

- A. Toxoplasma gondii
- B. Trypanosoma cruzi
- C. JC virus
- D. All of the above

JC virus, a human polyomavirus that is the etiologic agent of progressive multifocal leukoencephalopathy (PML) which is the only known clinical manifestation of JC virus infection.

356 Type of spinal cord disease seen in patients with AIDS is ?

Harrison's 18th Ed. 1562

- A. Vacuolar myelopathy
- B. Pure sensory ataxia
- C. Paresthesias & dysesthesias of lower extremities
- D. All of the above

357 Vacuolar myelopathy in patients with AIDS is pathologically similar to ?

Harrison's 18th Ed. 1562

- A. Transverse myelitis
- B. Subacute combined degeneration of cord
- C. Chronic arachnoiditis
- D. Tabes dorsalis

Vacuolar myelopathy in patients with AIDS is pathologically similar to subacute combined degeneration of cord.

358 Which of the following about myelopathy in AIDS is false ?

Harrison's 18th Ed. 1562

- A. Present in ~20% of patients with AIDS
- B. 90% patients have dementia
- C. Do not respond well to ARV drugs
- D. None of the above

359 Most common peripheral neuropathy in patients with HIV infection is ?

Harrison's 18th Ed. 1562

- A. Acute inflammatory demyelinating polyneuropathy
- B. Mononeuritis multiplex
- C. Proximal sensory polyneuropathy
- D. Distal sensory polyneuropathy

Most common peripheral neuropathy in HIV infection is a distal sensory polyneuropathy.

360 HIV-associated myopathy is due to ?

Harrison's 18th Ed. 1562

- A. HIV infection

- B. Zidovudine
- C. Generalized wasting syndrome
- D. All of the above

HIV-associated myopathy is due to HIV infection itself, zidovudine & generalized wasting syndrome.

361 Which of the following is the histologic hallmark of zidovudine-induced myopathy ?

Harrison's 18th Ed. 1562

- A. Red ragged fibers
- B. Nemaline rod bodies
- C. Cytoplasmic bodies
- D. Mitochondrial abnormalities

Zidovudine interfere with the function of mitochondrial polymerases. Its toxicity is dose-dependent & reversible following discontinuation of drug. Red ragged fibers are a histologic hallmark of zidovudine-induced myopathy.

362 Most common abnormal findings on fundusoscopic examination in advanced HIV infection is ?

Harrison's 18th Ed. 1563

- A. Chorioretinitis
- B. Retinal atrophy
- C. Cotton-wool spots
- D. Perivascular hemorrhage and exudate in retina

Most common abnormal findings in optical fundus is cotton-wool spots. These are hard white spots on surface of retina with irregular edge. They represent areas of retinal ischemia secondary to microvascular disease. They are not associated with visual loss & remain stable or improve over time.

363 Characteristic abnormal findings on fundusoscopic examination in HIV infection with CMV retinitis is ?

Harrison's 18th Ed. 1563

- A. Chorioretinitis
- B. Retinal atrophy
- C. Cotton-wool spots
- D. Perivascular hemorrhage and exudate in retina

The characteristic in HIV infection with CMV retinitis is perivascular hemorrhage & exudate in retina due to necrotic inflammatory process and the visual loss is irreversible. Rhegmatogenous retinal detachment after retinal atrophy in areas of prior inflammation may occur.

364 PORN stands for ?

Harrison's 18th Ed. 1563

- A. Progressive ocular retinal necrosis
- B. Progressive outer retinal necrosis
- C. Painful ocular retinal necrosis
- D. Painful outer retinal necrosis

In HIV, Progressive outer retinal necrosis occurs due to HSV & varicella zoster virus with pain, keratitis, and iritis.

365 HAART has had little effect on frequency of which of the following neoplastic diseases in HIV infection ?

Harrison's 18th Ed. 1564

- A. Kaposi's sarcoma
- B. Human papilloma virus associated malignancies
- C. Non-Hodgkin's lymphoma
- D. All of the above

HAART has had little effect on human papilloma virus (HPV)-associated malignancies and AIDS-associated systemic lymphomas.

366 Most common HPV genotype in HIV-infected population is ?

Harrison's 18th Ed. 1567

- A. 8 and 5
- B. 18 and 16
- C. 32 and 22
- D. 56 and 53

Most common HPV genotypes in the general population are 16 and 18. In HIV-infected population genotypes 56 and 53 predominate.

367 Lymphoma seen in patients with HIV infection is ?

Harrison's 18th Ed. 1566

- A. Grade III or IV immunoblastic lymphoma
- B. Burkitt's lymphoma
- C. Primary CNS lymphoma
- D. All of the above

Three categories of lymphoma seen with HIV infection are grade III or IV immunoblastic lymphoma, Burkitt's lymphoma, & primary CNS lymphoma.

368 Which of the following statements about idiopathic CD4+ T lymphocytopenia (ICL) is false ?

Harrison's 18th Ed. 1567

- A. Absolute CD4+ T cell count of $<300/\mu\text{L}$
- B. No evidence of HIV-1, HIV-2, HTLV-I, or HTLV-II
- C. Hypergammaglobulinemia
- D. Opportunistic diseases occur

In ICL, Ig levels are normal or decreased while HIV-infected individuals have hypergammaglobulinemia. Absolute CD4+ T cell count are $<300/\mu\text{L}$ or $<20\%$ of total T cells on at least two occasions 6 weeks apart.

369 Which of the following category is a viral reverse transcriptase inhibitor ?

Harrison's 18th Ed. 1569

- A. Nucleoside analogues
- B. Nucleotide analogues
- C. Nonnucleoside reverse transcriptase inhibitors
- D. All of the above

FDA-approved reverse transcriptase inhibitors include nucleoside analogues (zidovudine, didanosine, zalcitabine, stavudine, lamivudine, abacavir & emtricitabine), nucleotide analogue (tenofovir) & nonnucleoside reverse transcriptase inhibitors (nevirapine, delavirdine & efavirenz).

370 First class of drugs licensed for treatment of HIV infection was ?

Harrison's 18th Ed. 1569

- A. Viral reverse transcriptase enzyme inhibitors
- B. Viral protease enzyme inhibitors
- C. Viral integrase enzyme inhibitors
- D. Viral entry inhibitors

Viral reverse transcriptase enzyme inhibitors were the first class of drugs licensed for treatment of HIV infection.

371 A high-fat meal increases the bioavailability of all except ?

N Engl J Med 1998;338:1281

- A. Saquinavir
- B. Nelfinavir
- C. Indinavir
- D. Ritonavir capsules

372 Which of the following PI is not protein-bound in plasma ?

N Engl J Med 1998;338:1281

- A. Saquinavir
- B. Nelfinavir
- C. Indinavir
- D. Ritonavir

373 Which of the following protease inhibitors (PI) has the highest cerebrospinal fluid penetration ?

N Engl J Med 1998;338:1281

- A. Ritonavir
- B. Saquinavir
- C. Indinavir
- D. All of the above

374 Which of the following PI must be stored in an airtight container with a desiccant ?

N Engl J Med 1998;338:1281

- A. Saquinavir
- B. Nelfinavir
- C. Indinavir
- D. Ritonavir

375 Which of the following PI must be stored in a refrigerator ?

N Engl J Med 1998;338:1281

- A. Saquinavir
- B. Nelfinavir
- C. Indinavir
- D. Ritonavir

376 Which of the following PI contains alcohol ?

N Engl J Med 1998;338:1281

- A. Saquinavir
- B. Nelfinavir
- C. Indinavir
- D. Ritonavir

377 The combination of ritonavir and rifabutin is associated with an increased incidence of rifabutin-associated toxicity particularly ?

N Engl J Med 1998;338:1281

- A. Uveitis
- B. Peripheral neuropathy
- C. Cardiomyopathy
- D. Renal failure

378 Drug to be avoided with HIV protease inhibitors is ?

N Engl J Med 1998;338:1281

- A. Terfenadine
- B. Midazolam
- C. Cisapride
- D. All of the above

379 Area under the plasma concentration-time curve of Saquinavir is increased by ?

N Engl J Med 1998;338:1281

- A. Nelfinavir

- B. Indinavir
- C. Ritonavir
- D. All of the above

380 The most important side effect of Indinavir is ?

Harrison's 17th Ed. 1199

- A. Nephrolithiasis
- B. Peripheral neuropathy
- C. Glaucoma
- D. Ototoxicity

The main side effects of indinavir are nephrolithiasis.

381 Which of the following is not a Protease inhibitor ?

N Engl J Med 2004;350:1023

- A. Indinavir
- B. Saquinavir
- C. Ritonavir
- D. Tenofovir

382 Which of the following is not a NNRTI ?

N Engl J Med 2004;350:1023

- A. Efavirenz
- B. Nevirapine
- C. Zalcitabine
- D. Delavirdine

383 First drug approved by US FDA for treatment of AIDS is ?

Harrison's 18th Ed. 1574

- A. Zidovudine
- B. Zalcitabine
- C. Delavirdine
- D. Lamivudine

Zidovudine (AZT) was the first drug approved for the treatment of HIV infection and is the prototype nucleoside analogue.

384 Zidovudine was approved by US FDA for treatment of AIDS in ?

N Engl J Med 2001;344:1766

- A. 1983
- B. 1987
- C. 1990
- D. 1995

385 First protease inhibitor used along with zidovudine and lamivudine in "triple combination therapy" for HIV was ?

Harrison's 18th Ed. 1579

- A. Indinavir
- B. Saquinavir
- C. Ritonavir
- D. Nelfinavir

Indinavir was the first protease inhibitor used in combination with dual nucleoside therapy. Combination of zidovudine, lamivudine & indinavir was the first "triple combination" effective on HIV replication.

386 The first HIV-1 protease inhibitors to be licensed was ?

Harrison's 18th Ed. 1579

- A. Saquinavir

- B. Indinavir
- C. Ritonavir
- D. Nelfinavir

Saquinavir was the first HIV-1 protease inhibitors to be licensed.

387 Which of the following protease inhibitors is best-tolerated ?

Harrison's 18th Ed. 1579

- A. Saquinavir
- B. Indinavir
- C. Ritonavir
- D. Nelfinavir

Saquinavir is among the best-tolerated protease inhibitors.

388 Which of the following is a fusion inhibitor ?

N Engl J Med 2003;348:2228-38

- A. Abacavir
- B. Enfuvirtide
- C. Efavirenz
- D. Tenofovir

389 Which of the following antiretroviral medication is available as an intravenous formulation ?

N Engl J Med 2006;355:173-81

- A. Stavudine
- B. Zidovudine
- C. Lamivudine
- D. Didanosine

390 Which of the following drugs does not require dose adjustment in patients with renal insufficiency ?

N Engl J Med 2006;355:173-81

- A. Abacavir
- B. Didanosine
- C. Emtricitabine
- D. Lamivudine

391 Which of the following drugs does not require dose adjustment in patients with renal insufficiency ?

N Engl J Med 2006;355:173-81

- A. Abacavir
- B. Stavudine
- C. Zidovudine
- D. Lamivudine

Tenofovir is contraindicated in patients with renal impairment.

392 Which of the drugs require dose adjustment in patients with hepatic impairment ?

N Engl J Med 2006;355:173-81

- A. Atazanavir
- B. Fosamprenavir
- C. Indinavir
- D. All of the above

393 'Lactic acidosis syndrome' is a serious adverse effect of which of the following antiretroviral drug ?

N Engl J Med 2006;355:173-81, Harrison's 17th Ed. 1191

- A. Stavudine

- B. Didanosine
- C. Zidovudine
- D. All of the above

Lactic acidosis is most commonly seen with nucleoside analogue reverse transcriptase inhibitors.

394

Stevens - Johnson syndrome or toxic epidermal necrosis is a serious adverse effect of which of the following antiretroviral drug ?
N Engl J Med 2006;355:173-81, Harrison's 18th Ed. 1579

- A. Stavudine
- B. Didanosine
- C. Zidovudine
- D. Nevirapine

In HIV infection Stevens-Johnson syndrome may occur due to nonnucleoside reverse transcriptase inhibitors nevirapine, delavirdine, and efavirenz.

395

Which of the following antiretroviral medications is also active against hepatitis B virus (HBV) ?
N Engl J Med 2006;355:173-81, Harrison's 17th Ed. 1198

- A. Lamivudine
- B. Emtricitabine
- C. Tenofovir
- D. All of the above

Lamivudine, emtricitabine and tenofovir are used to treat hepatitis B infection in HIV infection.

396

Which of the following reverse transcriptase inhibitors are quite selective for the HIV-1 reverse transcriptase ?
Harrison's 18th Ed. 1569

- A. Nonnucleoside reverse transcriptase inhibitors
- B. Nucleoside analogues
- C. Nucleotide analogues
- D. All of the above

Nonnucleoside reverse transcriptase inhibitors are quite selective for the HIV-1 reverse transcriptase, the nucleoside and nucleotide analogues inhibit a variety of DNA polymerization reactions in addition to those of HIV-1 reverse transcriptase. Therefore, serious side effects are more varied with nucleoside analogues & include mitochondrial damage that can lead to hepatic steatosis, lactic acidosis, peripheral neuropathy & and pancreatitis.

397

Pancreatitis is the adverse effect of which of the following ?
Harrison's 18th Ed. 1572 Table 189-20

- A. Didanosine
- B. Zalcitabine
- C. Stavudine
- D. All of the above

398

Among the nucleoside analogues licensed for the treatment of HIV infection, which one is the weakest ?
Harrison's 18th Ed. 1578

- A. Didanosine
- B. Zalcitabine
- C. Abacavir
- D. Emtricitabine

Among nucleoside analogues (zidovudine, didanosine, zalcitabine, stavudine, lamivudine, abacavir & emtricitabine) licensed for the treatment of HIV infection, Zalcitabine is probably the weakest.

399

Action of zidovudine is antagonised by ?
Harrison's 18th Ed. 1578

- A. Didanosine

- B. Stavudine
- C. Abacavir
- D. Emtricitabine

Like zidovudine, stavudine is a thymidine analogue. These two drugs are antagonistic in vitro and in vivo and should not be given together.

400

Which of the following is the best tolerated & least toxic nucleoside analogue ?
Harrison's 18th Ed. 1578

- A. Lamivudine
- B. Stavudine
- C. Zidovudine
- D. Emtricitabine

Lamivudine is the best tolerated and least toxic nucleoside analogues.

401

Abacavir-resistant strains of HIV are also resistant to ?
Harrison's 18th Ed. 1578

- A. Lamivudine
- B. Didanosine
- C. Zalcitabine
- D. All of the above

Abacavir-resistant strains of HIV are typically also resistant to lamivudine, didanosine & zalcitabine.

402

In patients who are HLA-B5701, which of the following can produce hypersensitivity ?
Harrison's 18th Ed. 1578

- A. Tenofovir
- B. Didanosine
- C. Abacavir
- D. Emtricitabine

Abacavir hypersensitivity occurs more in patients who are HLA-B57.

403

Vivid dreams is a side effect of which of the following nonnucleoside inhibitors of HIV-1 reverse transcriptase ?
Harrison's 18th Ed. 1578

- A. Nevirapine
- B. Delavirdine
- C. Efavirenz
- D. Etravirine

Some patients treated with efavirenz complain of vivid dreams.

404

Which of the following results in inhibition of cytochrome P450 action ?
Harrison's 18th Ed. 1579

- A. Tenofovir
- B. Indinavir
- C. Ritonavir
- D. Nelfinavir

Ritonavir has a high affinity for several isoforms of cytochrome P450 thereby inhibiting cytochrome P450 action. Its use results in large increases in plasma concentrations of drugs metabolized by this pathway. Saquinavir is also metabolized by cytochrome P450 system.

405

Which of the following increases the activity of glucuronyltransferases ?
Harrison's 18th Ed. 1579

- A. Tenofovir

- B. Indinavir
- C. Ritonavir
- D. Nelfinavir

Ritonavir may increase the activity of glucuronyltransferases, thus decreasing the levels of drugs metabolized by this pathway.

406 Indinavir levels are decreased during concurrent therapy with ?

Harrison's 18th Ed. 1579

- A. Rifabutin
- B. Efavirenz
- C. Nevirapine
- D. All of the above

407 Indinavir levels are increased during concurrent therapy with ?

Harrison's 18th Ed. 1579

- A. Ketoconazole
- B. Delavirdine
- C. Ritonavir
- D. All of the above

Levels of indinavir are decreased during concurrent therapy with rifabutin, efavirenz, or nevirapine and increased during concurrent therapy with ketoconazole, delavirdine, or ritonavir.

408 Total cholesterol & triglyceride levels do not increase with which of the following protease inhibitors ?

Harrison's 18th Ed. 1580

- A. Tenofovir
- B. Indinavir
- C. Atazanavir
- D. Nelfinavir

Total cholesterol & Tg levels do not increase as much with atazanavir as with other protease inhibitors.

409 Prolongations of PR interval occurs with which of the following protease inhibitors ?

Harrison's 18th Ed. 1580

- A. Tenofovir
- B. Indinavir
- C. Atazanavir
- D. Nelfinavir

Atazanavir is associated with prolongations of PR interval.

410 Molecule of which of the following contain a sulfonamide moiety ?

Harrison's 18th Ed. 1580

- A. Atazanavir
- B. Tipranavir
- C. Fosamprenavir
- D. Darunavir

Molecule of Darunavir contain a sulfonamide moiety.

411 Which of the following drugs is a CCR5 antagonist ?

Harrison's 18th Ed. 1580

- A. Enfuvirtide
- B. Maraviroc
- C. Raltegravir
- D. All of the above

Maraviroc is a CCR5 antagonist that interferes with HIV binding at the stage of co-receptor engagement.

412 Enfuvirtide is best related to which of the following ?

Harrison's 18th Ed. 1580

- A. gp41
- B. gp120
- C. gp160
- D. p24

Enfuvirtide interferes with the fusion of viral & cellular membranes by binding to HR1 region in gp41 subunit of the HIV-1 envelope.

413 Which of the following ARV is an integrase inhibitor ?

Harrison's 18th Ed. 1580

- A. Fosamprenavir
- B. Raltegravir
- C. Enfuvirtide
- D. Maraviroc

Raltegravir is an inhibitor of the viral enzyme integrase.

414 Guidelines for the use of ARV therapy include ?

Harrison's 18th Ed. 1581

- A. Should not be used as monotherapy for HIV infection
- B. Immediate treatment of every HIV-infected individual upon diagnosis may not be prudent
- C. Patients started on ARV should remain on ARV therapy
- D. All of the above

415 Following the initiation of ARV therapy, a 1 log (tenfold) reduction in plasma HIV RNA levels is expected within ?

Harrison's 18th Ed. 1581

- A. 1 - 2 months
- B. 2 - 3 months
- C. 3 - 4 months
- D. 4 - 6 months

Following initiation of ARV therapy one should expect a 1 log (tenfold) reduction in plasma HIV RNA levels within 1 - 2 months, eventually a decline in plasma HIV RNA levels to <50 copies per milliliter and a rise in CD4+ T cell count of 100 - 150/ μ L.

416 Plasma HIV RNA levels & CD4+ T lymphocyte counts should be monitored how frequently during therapy ?

Harrison's 18th Ed. 1582

- A. Every 1 - 2 months
- B. Every 2 - 3 months
- C. Every 3 - 4 months
- D. Every 4 - 6 months

Plasma HIV RNA levels & CD4+ T lymphocyte counts should be monitored every 3 - 4 months during therapy.

417 Genotyping of HIV quasiespecies may be done by ?

Harrison's 18th Ed. 1582

- A. Dideoxynucleotide sequencing
- B. DNA chip hybridization
- C. Line probe assays
- D. All of the above

Genotyping of HIV quasiespecies may be done through dideoxynucleotide sequencing, DNA chip hybridization, or line probe assays.

418 The first case of HIV transmission from a patient to health care worker was reported in ?

Harrison's 18th Ed. 1582

- A. 1982
- B. 1983
- C. 1984
- D. 1985

419 The risk of HIV infection following a percutaneous exposure to HIV-contaminated blood is ?

Harrison's 18th Ed. 1583, N Engl J Med 2009;361:1768-75

- A. ~ 0.1 %
- B. ~ 0.2 %
- C. ~ 0.3 %
- D. ~ 0.4 %

Risk of HIV infection following a percutaneous exposure to HIV-contaminated blood is ~0.3%

420 The risk of HIV infection following a mucous membrane exposure to HIV-contaminated blood is ?

Harrison's 18th Ed. 1583, N Engl J Med 2009;361:1768-75

- A. ~ 0.04 %
- B. ~ 0.09 %
- C. ~ 0.9 %
- D. ~ 1.4 %

Splashes of infectious material to mucous membranes (conjunctivae or oral mucosa) or broken skin may transmit HIV infection (risk per exposure is 0.09%).

421 Which of the following is false about per-contact risk of HIV transmission from sexual exposure ?

N Engl J Med 2009;361:1768-75

- A. 1 to 30% with receptive anal intercourse
- B. 0.1 to 1.0% with insertive vaginal intercourse
- C. 0.1 to 10.0% with receptive vaginal intercourse
- D. None of the above

Estimated per-contact risk of HIV transmission from sexual exposure are 1 to 30% with receptive anal intercourse, 0.1 to 10.0% with insertive anal intercourse & receptive vaginal intercourse, & 0.1 to 1.0% with insertive vaginal intercourse.

422 The estimated risk of HIV transmission with sharing needles for injection-drug use is ?

N Engl J Med 2009;361:1768-75

- A. ~0.67 % per needle-sharing contact
- B. ~1.67 % per needle-sharing contact
- C. ~3.67 % per needle-sharing contact
- D. ~6.67 % per needle-sharing contact

The estimated risk of transmission associated with sharing needles for injection-drug use is approximately 0.67% per needle-sharing contact.

423 Source HIV-positive patients have a viral load of ?

N Engl J Med 2009;361:1768-75

- A. >= 100 copies per milliliter
- B. >= 500 copies per milliliter
- C. >= 1000 copies per milliliter
- D. >= 1500 copies per milliliter

Source HIV-positive patients have a high viral load of >= 1500 copies/mL.

424 Greater benefit of postexposure HIV prophylaxis is obtained when it is initiated within ?

N Engl J Med 2009;361:1768-75

- A. 36 hours
- B. 48 hours
- C. 72 hours
- D. 96 hours

Postexposure prophylaxis should be initiated as rapidly as possible after exposure to HIV. Greater benefit of PEP is obtained when initiated within 36 hours after exposure as compared with 72 hours after exposure.

425 Postexposure ARV prophylaxis (PEP) is given for ?

Harrison's 18th Ed. 1583

- A. 2 weeks
- B. 4 weeks
- C. 6 weeks
- D. 8 weeks

Recommendations postexposure ARV prophylaxis (PEP) are that a combination of two NRTI's for less severe exposures & combination of two NRTI's plus a third drug for more severe exposures be given for 4 weeks.

Chapter 165. Tuberculosis

426 Robert Koch won the Nobel Prize in which year ?

N Engl J Med 2012;367:931-6

- A. 1905
- B. 1910
- C. 1915
- D. 1920

Robert Koch received the 1905 Nobel Prize. His manuscript was published in the Berliner Klinische Wochenschrift.

427 M. tuberculosis complex includes all of the following species except ?

- A. M. tuberculosis
- B. M. bovis
- C. M. africanum
- D. M. xenopi

M. tuberculosis complex includes M. tuberculosis, M. bovis, M. africanum & M. microti.

428 Tuberculosis also called "phthisis" which in Greek means ?

- A. Wasting away
- B. Swollen glands
- C. Dark pigmentation of skin
- D. Chronic cough

429 MIRUs in genome of M. tuberculosis means ?

N Engl J Med 2003;349:1149-56

- A. Mycobacterial interpolated repeat units
- B. Mycobacterial interference repeat units
- C. Mycobacterial interspersed representative units
- D. Mycobacterial interspersed repeat units

Genome of M. tuberculosis contains many mycobacterial interspersed repeat units (MIRUs), some containing identical repeat units & others containing repeats that vary slightly in sequence & length. MIRU genotyping categorizes the number & size of the repeats in each of 12 independent MIRUs, with the use of a polymerase-chain-reaction (PCR) assay, followed by gel electrophoresis.

430 Which of the following about *M. tuberculosis* is false ?

Harrison's 18th Ed. 1340

- A. Rod-shaped
- B. Spore-forming
- C. Aerobic bacterium
- D. Measures about 0.5 μm by 3 μm

M. tuberculosis is a rod-shaped, non-spore-forming, thin aerobic bacterium measuring 0.5 μm by 3 μm .

431 Acid fastness of *M. tuberculosis* bacterium is due to high content of ?

Harrison's 18th Ed. 1340

- A. Phenolic acids in cell wall
- B. Mycolic acids in cell wall
- C. Tyrosine in cell wall
- D. Glucosamine in cell wall

Acid fastness is due mainly to the organisms' high content of mycolic acids, long-chain cross-linked fatty acids, and other cell-wall lipids.

432 Which of the following microorganisms display acid fastness ?

Harrison's 18th Ed. 1340

- A. *Nocardia*
- B. *Rhodococcus*
- C. *Legionella micdadei*
- D. All of the above

433 Which of the following microorganisms display acid fastness ?

Harrison's 18th Ed. 1340

- A. *Isospora*
- B. *M. tuberculosis*
- C. *Cryptosporidium*
- D. All of the above

*Microorganisms other than mycobacteria that display some acid fastness include species of *Nocardia* and *Rhodococcus*, *Legionella micdadei*, and the protozoa *Isospora* and *Cryptosporidium*.*

434 Which of the following is a component of mycobacterial cell wall ?

Harrison's 18th Ed. 1340

- A. Mycolic acids
- B. Arabinogalactan
- C. Lipoarabinomannan (LAM)
- D. All of the above

Molecules in the mycobacterial cell wall include mycolic acid, arabinogalactan, peptidoglycan and lipoarabinomannan.

435 Which of the following facilitates the survival of *M. tuberculosis* within macrophages ?

Harrison's 18th Ed. 1340

- A. Mycolic acids
- B. Arabinogalactan
- C. Lipoarabinomannan
- D. All of the above

*Lipoarabinomannan present in mycobacterial cell wall is involved in the pathogen-host interaction and facilitates the survival of *M. tuberculosis* within macrophages.*

436 Complete genome sequence of *M. tuberculosis* comprises about ?

Harrison's 18th Ed. 1340

- A. 2000 genes
- B. 3000 genes
- C. 4000 genes
- D. 5000 genes

*The complete genome sequence of *M. tuberculosis* comprises 4043 genes encoding 3993 proteins & 50 genes encoding RNAs.*

437 Large proportion of the genes in *M. tuberculosis* genome are devoted to ?

Harrison's 18th Ed. 1340

- A. Production of liposomal enzymes
- B. Production of enzymes involved in cell wall metabolism
- C. Glycogenolysis
- D. Production of proline-rich proteins

A large proportion of genes are devoted to the production of enzymes involved in cell wall metabolism.

438 Mycobacteria bind to which of the following macrophage cell-surface molecules ?

Harrison's 18th Ed. 1343

- A. Complement receptors
- B. Mannose receptor
- C. Immunoglobulin G Fc γ receptor
- D. All of the above

Mycobacteria bind to the following macrophage cell-surface molecules - complement receptors, mannose receptor, immunoglobulin G Fc γ receptor and type A scavenger receptors.

439 Phagosome-lysosome fusion is related to ?

Harrison's 18th Ed. 1343

- A. Mannose receptor
- B. Complement activation
- C. Ca²⁺/calmodulin pathway
- D. Type A scavenger receptors

Lipoarabinomannan (LAM) inhibits intracellular increase of Ca²⁺ thereby impairing Ca²⁺/calmodulin pathway which is essential in phagosome-lysosome fusion & eventually arresting phagosome maturation.

440 Which of the following is an essential component of phago-lysosome biogenesis ?

- A. Phosphatidyl-inositol-1-phosphate [(PI(1)P)]
- B. Phosphatidyl-inositol-2-phosphate [(PI(2)P)]
- C. Phosphatidyl-inositol-3-phosphate [(PI(3)P)]
- D. Phosphatidyl-inositol-4-phosphate [(PI(4)P)]

Mycobacteria prevent the accumulation of phosphatidyl-inositol-3-phosphate [(PI(3)P)], an essential component of phago-lysosome biogenesis at the phagosomal membrane. As a result, PI(3)P dependent recruitment of the late endosomal markers Hrs (hepatocyte growth factor regulated tyrosine kinase substrate) and EEA1 (early endosome antigen 1) via PI(3)P is abolished and phagosomes fail to fuse with lysosomes.

441 Which of the following is a PI(3)P binding protein ?

Harrison's 18th Ed. 1343

- A. LAMP1
- B. EEA1 (early endosome antigen 1)
- C. Rab7

D. v-ATPase

Mycobacterial phagosomes are characterized by the absence of late endosomal or lysosomal markers like Rab7, v-ATPase, LAMP1, and two PI(3)P binding proteins EEA1 and Hrs. M. tuberculosis phagosome inhibits production of phosphatidylinositol 3-phosphate (PI3P). Normally, PI3P earmarks phagosomes for membrane sorting & maturation including phagolysosome formation, which would destroy the bacteria.

442 M. tuberculosis droplet nuclei may be aerosolized by ?

Harrison's 18th Ed. 1342

- A. Coughing
- B. Sneezing
- C. Speaking
- D. All of the above

M. tuberculosis is most commonly transmitted from a patient with infectious pulmonary tuberculosis to other persons by droplet nuclei, which are aerosolized by coughing, sneezing, or speaking.

443 What is the size of the M. tuberculosis infecting droplets ?

Harrison's 18th Ed. 1342

- A. < 10 µm in diameter
- B. < 20 µm in diameter
- C. < 30 µm in diameter
- D. < 40 µm in diameter

Droplet nuclei <10 µm in diameter may remain suspended in air for several hours and may gain direct access to terminal air passages when inhaled.

444 Route of transmission of tubercle bacilli is ?

Harrison's 18th Ed. 1342

- A. Aerosolized droplet nuclei
- B. Skin
- C. Placenta
- D. All of the above

Apart from aerosolized droplet nuclei, other routes of transmission of tubercle bacilli are through the skin or the placenta.

445 Among infected persons, the incidence of tuberculosis is highest in ?

Harrison's 18th Ed. 1342

- A. Children
- B. Late adolescence and early adulthood
- C. Middle age
- D. Old age

Among infected persons, the incidence of tuberculosis is highest during late adolescence and early adulthood. In the age group of 25 to 34 years, rates among women are higher than those among men, while at older ages the opposite is true.

446 Conditions known to increase risk of active tuberculosis among persons infected with tubercle bacilli include ?

Harrison's 18th Ed. 1342 Table 165-1

- A. Silicosis
- B. Intravenous drug use
- C. Jejunoileal bypass
- D. All of the above

447 Conditions known to increase risk of active tuberculosis among persons infected with tubercle bacilli include all except ?

Harrison's 18th Ed. 1342 Table 165-1

- A. Gastrectomy and jejunoileal bypass surgery
- B. HIV infection

C. Old, self-healed, fibrotic lesions

D. Mental retardation

Several conditions favor the development of active tuberculosis among infected individuals, most important being HIV co-infection.

448 5-year mortality rate among sputum smear positive cases of untreated tuberculosis is ?

Harrison's 18th Ed. 1342

- A. 35 %
- B. 45 %
- C. 55 %
- D. 65 %

The 5-year mortality rate among sputum smear positive cases of untreated tuberculosis is 65%.

449 Opsonization refers to ?

Harrison's 16th Ed. 698

- A. Rupture of cell wall of bacteria by antibody
- B. Nonspecific activation of macrophages
- C. Coating by antibody & complement in preparation for phagocytosis
- D. Invasion of macrophages by bacteria

Although tissue macrophages & polymorphonuclear leukocytes (PMNs) are capable of killing microorganisms without help, they function much more efficiently when pathogens are first opsonized (Greek, "to prepare for eating") by components of complement system such as C3b &/or by antibodies.

450 Internal environment of macrophage where M. tuberculosis resides and survives is ?

- A. Mildly acidic
- B. Moderately acidic
- C. Severely acidic
- D. None of the above

M. tuberculosis resides in a compartment of macrophages that does not contain lysosomal markers. Its vacuolar membrane lacks host vacuolar ATPase that is needed for vesicle acidification. Thus, internal environment of the macrophage is never acidified. Lysosomal enzymes are only effective in acidic environments, the enzymes are never activated within macrophage and therefore, M. tuberculosis is able to survive within macrophage.

451 Best characterized strain of M. tuberculosis is ?

- A. H36R
- B. H37R
- C. H38R
- D. H39R

The best characterized strain of Mycobacterium tuberculosis is H37R.

452 Mycobacterium tuberculosis is a slow-growing bacteria that divides every ?

- A. 16 - 20 hours
- B. 36 - 48 hours
- C. 48 - 60 hours
- D. 72 - 90 hours

Mycobacterium tuberculosis is a slow-growing bacteria that divides every 16 - 20 hours. M. tuberculosis can only replicate & grow within a host organism.

453 Which of the following best relates to the pathogenicity of Mycobacterium tuberculosis ?

- A. Slow generation time
- B. Phagolysosome formation

- C. Phagosome maturation arrest
- D. Resistance to osmotic lysis

Phagosome maturation arrest best relates to pathogenicity of *M. tuberculosis*. Mycobacterial phagosomal maturation arrest is by LAM-mediated disruption of Ca^{2+} calmodulin dependent regulation of PI3P & EEA1 on phagosomes. These help keep vacuoles away from bactericidal and antigen processing organelles in infected macrophages. LAM prevents increases of Ca^{2+} surge, prevents the interaction of a kinase and downstream recruitment of EEA1. EEA1 and syntaxin 6 are necessary components of the lysosomal compartment.

- 454 What fraction of inhaled droplet nuclei containing *M. tuberculosis* microorganisms reach the alveoli ?
Harrison's 18th Ed. 1342
- A. 10 %
- B. 15 %
- C. 20 %
- D. 25 %

Majority of inhaled TB bacilli are trapped in upper airways and expelled by ciliated mucosal cells, about 10% reach the alveoli.

- 455 Gene thought to confer virulence to *M. tuberculosis* is ?
Harrison's 18th Ed. 1343
- A. katG
- B. rpoV
- C. erp
- D. All of the above

Genes that confer virulence to *M. tuberculosis* are katG, rpoV, erp. Defects in katG, rpoV genes result in loss of virulence. katG gene encodes for catalase/peroxidase enzymes that protect against oxidative stress, rpoV is the main sigma factor initiating transcription of several genes. Defects in these two genes result in loss of virulence. Product of rpoB gene is RNA polymerase. The erp gene, encoding a protein required for multiplication, also contributes to virulence.

- 456 Beijing family of *M. tuberculosis* strains was described in year ?
- A. 1984
- B. 1990
- C. 1995
- D. 2000

Beijing family of *M. tuberculosis* strains was described in 1995.

- 457 Revised National Tuberculosis Control Program started in ?
- A. 1990
- B. 1993
- C. 1995
- D. 1998

Revised National Tuberculosis Control Program was begun in 1993.

- 458 Beijing/W genotype family of *M. tuberculosis* is associated with all except ?
- A. Lower mortality rates
- B. Multibanded IS6110 restriction fragment length polymorphism (RFLP) patterns
- C. Highest density found in Beijing
- D. Largest genotype family of *M. tuberculosis*

Strains of the Beijing/W genotype family are associated with higher mortality rates. BCG-induced immunological defense may protect against most *M. tuberculosis* strains but not against selected genotypes (called escape variants), such as *M. tuberculosis* Beijing isolates. IS6110 sequence is not found in NTM.

- 459 Which of the following is not a *M. tuberculosis* genotype family ?
- A. Gibraltar
- B. Latino-American
- C. Mediterranean
- D. Haarlem

M. tuberculosis genotype families are Beijing family, Latino-American and Mediterranean family, Haarlem family, the X clade.

- 460 Which of the following gene in humans plays a role in determining susceptibility to tuberculosis ?
Harrison's 18th Ed. 1343
- A. katG
- B. rpoV
- C. erp
- D. NRAMP1

In humans, NRAMP1 (chromosome 2q) may play a role in innate nonimmune resistance to infection with *M. tuberculosis* and development of disease.

- 461 Cell mediated immunity (CMI) & humoral immunity begin how many weeks after *M. tuberculosis* infection ?
Harrison's 18th Ed. 1343
- A. 1 - 2
- B. 2 - 4
- C. 4 - 6
- D. 6 - 8

Cell mediated immunity (CMI) & humoral immunity begin 2 - 4 weeks after *M. tuberculosis* infection.

- 462 Which of the following is a “T cell - mediated phenomenon” ?
Harrison's 18th Ed. 1343
- A. Fusion between phagosomes & lysosomes
- B. Recruitment of immature monocyte-derived macrophages
- C. Macrophage-activating response
- D. Tissue-damaging response

Macrophage-activating response is a T cell - mediated phenomenon resulting in activation of macrophages capable of killing & digesting tubercle bacilli.

- 463 Which of the following is a “delayed-type hypersensitivity (DTH) reaction” ?
Harrison's 18th Ed. 1343
- A. Fusion between phagosomes & lysosomes
- B. Recruitment of immature monocyte-derived macrophages
- C. Macrophage-activating response
- D. Tissue-damaging response

About 2-4 weeks after infection, two host responses to *M. tuberculosis* develop to inhibit mycobacterial growth. First, a macrophage-activating CMI response (T cell - mediated phenomenon) and second a tissue-damaging response (delayed-type hypersensitivity (DTH) reaction).

- 464 Caseous necrosis of involved tissues is the result of ?
Harrison's 18th Ed. 1343
- A. Fusion between phagosomes & lysosomes
- B. Recruitment of immature monocyte-derived macrophages
- C. Macrophage-activating response
- D. Tissue-damaging response

The tissue-damaging response destroys unactivated macrophages containing multiplying bacilli and causes caseous necrosis of involved tissues.

465 Caseous necrosis may also be observed in ?

Harrison's 18th Ed. 1344

- A. Neoplasms
- B. Burns
- C. Lymphedema
- D. All of the above

Soft cheese or caseous necrosis may also be observed in neoplasms.

466 Growth of *M. tuberculosis* is inhibited by ?

Harrison's 18th Ed. 1344

- A. Low oxygen tension
- B. Low pH
- C. Nitric oxide
- D. All of the above

*Growth of *M. tuberculosis* is inhibited within necrotic environment by low oxygen tension & low pH. Monocytes & macrophages produce nitric oxide which has antimycobacterial activity.*

467 Which of the following plays a role in processing & presenting *M. tuberculosis* antigens to T lymphocytes ?

Harrison's 18th Ed. 1344

- A. Alveolar macrophages
- B. Monocytes
- C. Dendritic cells
- D. All of the above

*Alveolar macrophages, monocytes, and dendritic cells are critical in processing & presenting *M. tuberculosis* antigens to T lymphocytes.*

468 ESAT6 stands for ?

Lancet Infect Dis 2005;5:415-30, Harrison's 18th Ed. 1343

- A. Essential secretory antigenic target 6
- B. Epidemic secretory antigenic target 6
- C. Early secretory antigenic target 6
- D. Episodic secretory antigenic target 6

469 CFP10 stands for ?

Lancet Infect Dis 2005;5:415-30, Harrison's 18th Ed. 1343

- A. Culture filtrate protein 10
- B. Cell filtrate protein 10
- C. Cryo filtrate protein 10
- D. Cytoplasmic filtrate protein 10

*Newer in-vitro T-cell based interferon gamma assays using early secretory antigenic target 6 (ESAT6) & culture filtrate protein 10 (CFP10) that are absent in BCG but are major targets of T-cell response to *M. tuberculosis* are commercially available in ELISA & ELISPOT formats with higher sensitivity than tuberculin skin test (TST). They are less affected by malnutrition, HIV infection & BCG vaccination.*

470 Which of the following statements about primary pulmonary tuberculosis is false ?

Harrison's 18th Ed. 1345

- A. Seen in children
- B. Localized to middle and lower lung zones
- C. Lesion is central & accompanied by hilar or paratracheal lymphadenopathy
- D. Lesion heals spontaneously

Primary pulmonary tuberculosis results from an initial infection with tubercle bacilli. It is often seen in children and is frequently localized to middle and lower lung zones. The lesion forming after infection is usually "peripheral" and accompanied by hilar or paratracheal lymphadenopathy.

471 What is Ghon lesion ?

Harrison's 18th Ed. 1345

- A. Calcified paratracheal lymph node
- B. A small calcified TB nodule in lung
- C. Hemorrhage in a tubercular cavity
- D. None of the above

In primary pulmonary tuberculosis, the lung lesion may heal spontaneously and appear as a small calcified nodule termed Ghon lesion at a later date.

472 Post primary pulmonary tuberculosis is also called ?

Harrison's 18th Ed. 1345

- A. Adult-type tuberculosis
- B. Reactivation tuberculosis
- C. Secondary tuberculosis
- D. Any of the above

Post primary pulmonary tuberculosis is also called adult-type, reactivation, or secondary tuberculosis.

473 Which of the following about postprimary pulmonary tuberculosis is false ?

Harrison's 18th Ed. 1345

- A. Due to endogenous reactivation of latent infection
- B. Localized to apical & posterior segments of upper lobes
- C. Superior segments of lower lobes frequently involved
- D. None of the above

Postprimary disease is due to endogenous reactivation of latent infection. It is usually localized to apical and posterior segments of the upper lobes & superior segments of lower lobes are frequently involved.

474 The process of chronic, progressively debilitating course of postprimary pulmonary tuberculosis is also called ?

Harrison's 18th Ed. 1345

- A. Consumption
- B. Corrosion
- C. Exasperate
- D. Decay

The process of chronic, progressively debilitating course of postprimary pulmonary tuberculosis is also called "consumption".

475 Rasmussen's aneurysm refers to ?

Harrison's 18th Ed. 1345

- A. Aortic aneurysm secondary to tuberculosis
- B. Pulmonary artery aneurysm secondary to tuberculosis
- C. Dilated vessel in a tubercular cavity
- D. Dilatation of a major bronchus

A dilated vessel in a tubercular cavity is called Rasmussen's aneurysm. It can lead to hemoptysis.

476 Massive hemoptysis in pulmonary TB is due to ?

Harrison's 18th Ed. 1345

- A. Erosion of blood vessel in wall of a cavity
- B. Rupture of a dilated vessel in a cavity
- C. Aspergilloma formation in an old cavity
- D. Any of the above

Massive hemoptysis in pulmonary TB may be a consequence of erosion of a blood vessel in the wall of a cavity, from rupture of a dilated vessel in a cavity (Rasmussen's aneurysm) or from aspergilloma formation in an old cavity.

477 In pulmonary TB, detectable rales can be heard over involved areas during inspiration especially after ?

Harrison's 18th Ed. 1345

- A. Exercise
- B. Lying prone
- C. Full meal
- D. Coughing

In pulmonary TB, detectable rales can be heard over involved areas during inspiration especially after coughing.

478 In TB, fever is ?

Harrison's 18th Ed. 1346

- A. Intermittent
- B. Remittent
- C. Continuous
- D. Any of the above

In TB, the fever is often low-grade and intermittent in up to 80% of cases.

479 What is Ranke complex ?

Harrison's 16th Ed. 957

- A. Healed calcified lesion in lung parenchyma & hilar lymph nodes
- B. Fibrocavitary lung lesion
- C. Calcification of pleura
- D. None of the above

480 Which is the most commonly involved site in extrapulmonary tuberculosis ?

Harrison's 18th Ed. 1346

- A. Lymph nodes
- B. Pleura
- C. Genitourinary tract
- D. Bones & joints

481 Out of the following, which is the least commonly involved site in extrapulmonary tuberculosis ?

Harrison's 18th Ed. 1346

- A. Meninges
- B. Pleura
- C. Genitourinary tract
- D. Bones & joints

482 Out of the following, which is the least commonly involved site in extrapulmonary tuberculosis ?

Harrison's 18th Ed. 1346

- A. Meninges
- B. Peritoneum
- C. Genitourinary tract
- D. Bones & joints

In order of frequency, the extrapulmonary sites most commonly involved in tuberculosis are the lymph nodes, pleura, genitourinary tract, bones and joints, meninges, peritoneum & pericardium.

483 In what percentage of tubercular lymph-node biopsy are AFB seen ?

Harrison's 18th Ed. 1346

- A. 25 %
- B. 50 %

C. 80 %

D. 100 %

In fine-needle aspiration or surgical biopsy of TB lymph node, AFB are seen in up to 80% of cases.

484 Lymph-node tuberculosis most commonly presents at which of the following sites ?

Harrison's 18th Ed. 1346

- A. Anterior cervical
- B. Posterior cervical
- C. Axilla
- D. Inguinal

Lymph-node tuberculosis mostly presents at posterior cervical and supraclavicular sites (scrofula).

485 Features of a typical tuberculous lymphadenitis include ?

- A. Caseating epithelioid cell granulomas
- B. Langerhans' giant cells
- C. Lymphocytic infiltrates
- D. All of the above

Features of a typical tuberculous lymphadenitis include areas of tuberculous granulation tissue with full-blown caseating epithelioid cell granulomas, Langerhans' giant cells & lymphocytic infiltrates.

486 Which of the following about Kikuchi-Fujimoto disease is false ?

- A. Necrotizing lymphadenitis
- B. Benign, self-limited disease
- C. Predominantly in old males
- D. Can occur in association with SLE

Features of Kikuchi-Fujimoto disease are necrotizing lymphadenitis, benign, self-limited disease, predominantly occurs in young women, presents as fever, cervical lymphadenopathy, and hepatosplenomegaly. It can precede or occur in association with SLE.

487 The only systemic manifestation of Kimura's disease is ?

- A. Cardiac
- B. Renal
- C. CNS
- D. Lung

Kimura's disease is a benign allergic inflammatory disorder of unknown cause endemic in Orientals. Renal involvement is its only systemic manifestation (membranous glomerulonephritis, minimal change glomerulonephritis, diffuse proliferative glomerulonephritis, mesangial proliferative glomerulonephritis and also nephrotic syndrome). It typically presents as non-tender preauricular & submandibular lymphadenopathy, peripheral eosinophilia and elevated IgE level.

488 Histiocytic necrotizing lymphadenitis is best related to ?

- A. Mikulicz's disease
- B. Kimura's disease
- C. Kikuchi-Fujimoto disease
- D. Tuberculous lymphadenitis

489 Benign lymphoepithelial lesion is best related to ?

- A. Mikulicz's disease
- B. Kimura's disease
- C. Kikuchi-Fujimoto disease
- D. Tuberculous lymphadenitis

Mikulicz's disease is a benign lymphoepithelial lesion presenting as benign enlargement of parotid and/or lacrimal glands sometimes associated with Sjögren's syndrome.

490 Angiofollicular hyperplasia is best related to ?

- A. Castleman's disease
- B. Mikulicz's disease
- C. Kimura's disease
- D. Kikuchi-Fujimoto disease

Castleman's disease is also referred to as angiofollicular hyperplasia.

491 Human Herpes Virus 8 (HHV8) is associated with ?

- A. Kaposi's sarcoma
- B. Primary Effusion lymphoma
- C. Multicentric Castleman's Disease
- D. All of the above

Human Herpes Virus 8 (HHV8) is associated with Kaposi's sarcoma, Primary Effusion lymphoma and multicentric Castleman's Disease.

492 Which of the following about tuberculous pleural fluid is false ?

Harrison's 18th Ed. 1346

- A. WBC count usually 500 to 6000/ μ L
- B. Protein concentration > 50 % of that in serum
- C. Normal to low glucose concentration
- D. pH generally > 7.4

The tubercular pleural fluid is an exudate with a protein concentration >50% of that in serum, a normal to low glucose concentration, pH ~ 7.3, and detectable WBC (500 to 6000/ μ L).

493 Which of the following cells is rare in tuberculous pleural fluid ?

Harrison's 18th Ed. 1347

- A. Neutrophils
- B. Mononuclear cells
- C. Mesothelial cells
- D. All of the above

In tuberculous pleural fluid, neutrophils may predominate in early stage. Later, mononuclear cells are the typical finding. Mesothelial cells are generally rare or absent.

494 Which of the following about tuberculous empyema is true ?

Harrison's 18th Ed. 1347

- A. Due to rupture of a tubercular cavity into pleural space
- B. Due to a bronchopleural fistula from pulmonary lesion
- C. May result in restrictive lung disease
- D. All of the above

Tuberculous empyema is the result of rupture of a tubercular cavity into pleural space, or of a bronchopleural fistula from a pulmonary lesion. It may result in severe pleural fibrosis & restrictive lung disease.

495 Tuberculosis of upper airways is a complication of ?

Harrison's 18th Ed. 1347

- A. Hematogenous spread
- B. Scrofula
- C. Advanced cavitory pulmonary TB
- D. Any of the above

Tuberculosis of upper airways is a complication is nearly always a complication of advanced cavitory pulmonary tuberculosis. It may involve larynx, pharynx and epiglottis.

496 Which of the following suggest tuberculosis as a cause of genitourinary disease ?

Harrison's 18th Ed. 1347

- A. Culture-negative pyuria in acidic urine
- B. Calcifications and ureteral strictures on IVP
- C. Preferential involvement of epididymis
- D. All of the above

Calcifications and ureteral strictures on IVP and documentation of culture-negative pyuria in acidic urine raises the suspicion of tuberculosis.

497 In males, genital tuberculosis preferentially affects which of the following ?

Harrison's 18th Ed. 1347

- A. Epididymis
- B. Testes
- C. Prostate
- D. All of the above

In male patients, tuberculosis preferentially affects the epididymis which may form an external fistula. Orchitis and prostatitis may also develop.

498 In skeletal tuberculosis, which of the following is most frequently affected ?

Harrison's 18th Ed. 1347

- A. Spine
- B. Hip joint
- C. Knee joint
- D. Ankle joint

Weight-bearing joints are affected most commonly in skeletal tuberculosis. Involvement of spine is more frequent than hip and knee.

499 Most common site of spinal tuberculosis in adults is ?

Harrison's 18th Ed. 1348

- A. Cervical
- B. Upper thoracic
- C. Lower thoracic
- D. Lower lumbar

In children, upper thoracic spine is the most common site of spinal tuberculosis. Lower thoracic and upper lumbar vertebrae are usually affected in adults.

500 Of the extrapulmonary TB cases in US, which is the least frequent ?

Harrison's 18th Ed. 1348

- A. Genitourinary tuberculosis
- B. Tuberculosis of bones & joints
- C. Lymph-node tuberculosis
- D. Gastrointestinal tuberculosis

Lymph-node tuberculosis >40%, TB involvement of pleura ~20%, Genitourinary tuberculosis ~15%, Tuberculosis of bones & joints ~10%, Gastrointestinal tuberculosis 3.5%, Tuberculosis of CNS ~5%.

501 Pathogenetic mechanism of gastrointestinal tuberculosis is ?

Harrison's 18th Ed. 1348

- A. Swallowing of sputum with direct seeding
- B. Hematogenous spread
- C. Ingestion of milk from tubercular cows
- D. All of the above

Pathogenetic mechanism of gastrointestinal tuberculosis may be swallowing of sputum with direct seeding, hematogenous spread or ingestion of milk from cows with bovine tuberculosis.

502 With intestinal-wall involvement in tuberculosis, the presentation may simulate which of the following ?

Harrison's 18th Ed. 1348

- A. Ulcerative colitis
- B. Amoebic colitis
- C. Appendicitis
- D. Crohn's disease

With intestinal-wall involvement in tuberculosis, ulcerations & fistulae may simulate Crohn's disease.

503 Which of the following is most commonly involved in gastrointestinal tuberculosis ?

Harrison's 18th Ed. 1348

- A. Duodenum
- B. Cecum
- C. Rectum
- D. Anal canal

Any portion of the gastrointestinal tract may be affected by tuberculosis. Terminal ileum and cecum are the sites most commonly involved.

504 The mechanism of tuberculous peritonitis is ?

Harrison's 18th Ed. 1348

- A. Direct spread of tubercle bacilli from ruptured lymph nodes
- B. Direct spread of tubercle bacilli from intraabdominal organ
- C. Hematogenous seeding
- D. Any of the above

Tuberculous peritonitis occurs either by direct spread of tubercle bacilli from ruptured lymph nodes and intraabdominal organs or hematogenous seeding.

505 In milary tuberculosis, the colour of granuloma lesions is ?

Harrison's 18th Ed. 1349

- A. Brown
- B. Yellow
- C. Black
- D. White

Lesions in milary tuberculosis are yellowish granulomas, 1 to 2 mm in diameter resembling millet seeds.

506 Out of the following, which one is pathognomonic of milary tuberculosis ?

Harrison's 18th Ed. 1349

- A. Hepatomegaly
- B. Splenomegaly
- C. Lymphadenopathy
- D. Choroidal tubercles

Clinical manifestations of milary tuberculosis are protean. Hepatomegaly, splenomegaly, and lymphadenopathy are frequent physical findings. Choroidal tubercles in eye examination is pathognomonic of milary tuberculosis.

507 Milary reticulonodular pattern is more easily seen on chest radiography that is ?

Harrison's 18th Ed. 1349

- A. Underpenetrated
- B. Overpenetrated
- C. Ideally exposed
- D. Any of the above

In milary tuberculosis, chest radiography reveals a milary reticulonodular pattern that is more easily seen on underpenetrated film.

508 HRCT finding in milary tuberculosis is termed as ?

- A. Glazed glass appearance
- B. White froth appearance
- C. Snowstorm appearance
- D. Sandstorm appearance

Coalescing nodules result into patchy irregular opacities and HRCT shows this variation effectively and has been described as "snowstorm appearance".

509 Cryptic milary tuberculosis is mostly seen in ?

Harrison's 18th Ed. 1349

- A. Neonates
- B. Children
- C. Adults
- D. Elderly

Cryptic milary tuberculosis is seen in elderly. It has a chronic course characterized by mild intermittent fever, anemia, and ultimately meningeal involvement preceding death.

510 Pancytopenia is common in which of the following ?

Harrison's 18th Ed. 1349

- A. Milary tuberculosis
- B. Cryptic milary tuberculosis
- C. Nonreactive milary tuberculosis
- D. All of the above

Nonreactive milary tuberculosis is an acute septicemic form, due to massive hematogenous dissemination of tubercle bacilli. Pancytopenia is common. Histopathologically, multiple necrotic but nongranulomatous ("nonreactive") lesions are detected.

511 Which of the following is false about 'Lupus vulgaris' ?

Harrison's 18th Ed. 1349

- A. A form of cutaneous tuberculosis
- B. Seen in previously infected and sensitized individuals
- C. Most lesions occur in head and neck area
- D. None of the above

Lupus vulgaris is a form of cutaneous tuberculosis that is seen in previously infected and sensitized individuals. Most lesions occur in head and neck area and are red-brown plaques with a yellow-brown color on diascopy.

512 Which of the following statements about tuberculosis in HIV-infected patients is false ?

Harrison's 18th Ed. 1349

- A. Increased frequency of sputum-smear negativity
- B. Atypical radiographic findings
- C. Lack of classic granuloma formation in early stages
- D. Negative TST

In tuberculosis in HIV-infected patients there is increased frequency of sputum-smear negativity, atypical radiographic findings (lower-zone infiltrates without cavity formation), lack of classic granuloma formation in late stages and negative TST.

513 Tissue specimen intended for tubercular culture should not be put in ?

Harrison's 18th Ed. 1350

- A. Saline
- B. Alcohol
- C. Formaldehyde
- D. Any of the above

Tissue specimen intended for tubercular culture should not be put in formaldehyde.

514 Which of the following is used for staining AFB ?

Harrison's 18th Ed. 1350

- A. Auramine-rhodamine staining
- B. Kinyoun staining
- C. Ziehl-Neelsen staining
- D. All of the above

515 Ziehl-Neelsen staining requires how many bacilli / ml ?

- A. 10^2 bacilli / ml
- B. 10^3 bacilli / ml
- C. 10^4 bacilli / ml
- D. 10^5 bacilli / ml

ZN staining requires 10^5 bacilli / ml.

516 Which of the following culture medium is used to grow mycobacteria ?

- A. Lowenstein - Jensen (LJ)
- B. Middlebrook 7H10
- C. Kirschner's
- D. All of the above

Three types of culture media are used to grow mycobacteria - Egg based (LJ, Petraghani and ATS), Agar based (Middlebrook 7H10 or 7H11) and Liquid based (Kirschner's, Middlebrook 7H9).

517 Biochemical marker test for diagnosis of tuberculosis is ?

- A. Adenosine deaminase (ADA)
- B. Bromide partition test
- C. Gas chromatography of mycobacterial fatty acids (Tuberculostearic acid)
- D. All of the above

Tuberculostearic acid (TBSA) is the characteristic fatty acid of acid-fast mycobacterial cell wall of the order Actinomycetales. Detection of TBSA in CSF by use of gas chromatography-mass spectrometry has proven to be a very rapid, sensitive, and specific test for tuberculous meningitis. The partition of bromide ion between serum and CSF after a loading dose reflects the integrity of the blood brain barrier. Either by direct chemical measurement or by using an isotopic tracer, the ratio of bromide in serum to that in CSF can be estimated. Values <1.6 are characteristic of TBM. It may be false +ve in herpes simplex, listeria, mumps, measles, pyogenic meningitis and hypothyroidism.

518 Adenosine deaminase (ADA) catalyzes the conversion of adenosine to ?

- A. Lysine
- B. Inosine
- C. Homocysteine
- D. Glycine

Adenosine deaminase (ADA) catalyzes the conversion of adenosine to inosine and is released by lymphocytes and macrophages during the cellular immune response. (Adenosine + H_2O + ADA = Inosine + NH_3 + ADA). ADA is also found in inflammatory fluids associated with RA, lymphoma, empyema, parapneumonic effusions and mesothelioma.

519 Patients with TB pleurisy have which type of ADA ?

- A. ADA_1
- B. ADA_2
- C. ADA_3
- D. ADA_4

Enzyme ADAp or "total pleural ADA level" is typically found at high concentrations in pleural TB. ADA_1 is found in all cells and ADA_2 reflects monocyte/macrophage activation. Patients with TB pleurisy have predominantly ADA_2 , whilst those with empyema and parainfective effusions have mainly ADA_1 . Ratio of $ADA_1/ADAp <0.42$ is a good indicator of TB pleurisy.

520 Which of the following radiographic pattern is considered pathognomonic for pulmonary tuberculosis ?

Harrison's 18th Ed. 1350

- A. Normal film
- B. Upper lobe disease with infiltrates and cavities
- C. Solitary pulmonary nodule
- D. None of the above

Although "classic" radiographic picture of pulmonary tuberculosis is upper lobe disease with infiltrates and cavities, virtually any radiographic pattern from a normal film or a solitary pulmonary nodule to diffuse alveolar infiltrates can be encountered. No radiographic pattern can be considered pathognomonic.

521 For the diagnosis of primary pulmonary tuberculosis in children, who often do not expectorate sputum, specimen for culture can be obtained from ?

Harrison's 18th Ed. 1351

- A. Nasal secretion
- B. Throat swab
- C. Early-morning gastric lavage
- D. Faeces

For the diagnosis of primary pulmonary tuberculosis in children, who often do not expectorate sputum, specimens from early-morning gastric lavage may yield positive cultures.

522 Master batch of PPD produced on directions of WHO and UNICEF was termed as ?

Harrison's 18th Ed. 1351

- A. RT21
- B. RT22
- C. RT23
- D. RT24

PPD-S was developed by Seibert and Glenn in 1941. WHO and UNICEF later sponsored large-scale production of a master batch of PPD, termed RT23, and made it available for general use.

523 IGRAs stands for ?

Harrison's 18th Ed. 1351

- A. IFN- γ Related Assays
- B. IFN- γ Response Assays
- C. IFN- γ Requiring Assays
- D. IFN- γ Release Assays

IGRAs stands for IFN- γ Release Assays.

524 Which of the following antituberculosis medication causes elevated uric acid level ?

Harrison's 17th Ed. 1034

- A. Rifampin
- B. Pyrazinamide
- C. Isoniazid
- D. Streptomycin

Hyperuricemia is a common adverse effect of pyrazinamide therapy. Its incidence is reduced by concurrent rifampin therapy. Clinical gout is rare.

525 Which of the following antituberculosis medication causes elevated uric acid level ?

Harrison's 17th Ed. 1034

- A. Rifampin
- B. Ethambutol
- C. Isoniazid

D. Streptomycin

Adverse effects of ethambutol includes hyperuricemia but is usually asymptomatic.

526 Which of the following antitubercular medication causes hypothyroidism ?

Harrison's 17th Ed. 1036

- A. Rifampin
- B. Ethionamide
- C. Isoniazid
- D. Streptomycin

Ethionamide is most useful in treatment of MDR tuberculosis. Its toxicity include intense gastrointestinal intolerance, serious neurologic reactions, reversible hepatitis, hypersensitivity reactions & hypothyroidism.

527 Which of the following antitubercular drug acts by impairing folate synthesis of M. tuberculosis ?

Harrison's 17th Ed. 1036

- A. Capreomycin
- B. Ethionamide
- C. Para-Aminosalicylic Acid (PAS)
- D. Ethambutol

PAS inhibits the growth of M. tuberculosis by impairing folate synthesis.

528 Revised National Tuberculosis Control Program was begun in which year ?

N Engl J Med 2002;347:1420-5

- A. 1991
- B. 1992
- C. 1993
- D. 1994

529 Which of the following Anti HIV drugs can be used with rifabutin ?

N Engl J Med 2003;349:1149-56

- A. Indinavir
- B. Nelfinavir
- C. Nevirapine
- D. All of the above

530 Which of the following Anti HIV drugs should not be used with rifabutin ?

N Engl J Med 2003;349:1149-56

- A. Indinavir
- B. Nelfinavir
- C. Ritonavir
- D. Nevirapine

531 Which of the following Anti HIV drugs should not be used with rifabutin ?

N Engl J Med 2003;349:1149-56

- A. Indinavir
- B. Nelfinavir
- C. Delavirdine
- D. Nevirapine

532 Multidrug-resistant tuberculosis is defined as ?

N Engl J Med 2003;349:1149-56

- A. Resistance to isoniazid

- B. Resistance to rifampin
- C. Resistance to at least isoniazid and rifampin
- D. All of the above

533 Conditions that confer predisposition to progression from latent tubercular infection to active disease include ?

N Engl J Med 2003;349:1149-56

- A. Persons coinfecting with HIV and M. tuberculosis
- B. Diabetes mellitus
- C. Chronic renal failure
- D. All of the above

534 Conditions that confer predisposition to progression from latent tubercular infection to active disease include ?

N Engl J Med 2003;349:1149-56

- A. Head or neck cancer
- B. Organ transplantation
- C. Injection-drug use
- D. All of the above

535 What quantity of intradermal injection of purified protein derivative is given in Mantoux test ?

N Engl J Med 2003;349:1149-56

- A. 2 TU
- B. 3 TU
- C. 4 TU
- D. 5 TU

536 A negative sputum smear with pulmonary tuberculosis is defined as how many new sputum smears negative for AFB ?

N Engl J Med 2002;347:1421

- A. At least two
- B. At least three
- C. At least four
- D. At least five

537 Without sputum culture, a positive sputum smear is defined as how many new sputum smears positive for AFB ?

N Engl J Med 2002;347:1421

- A. One or more
- B. Two or more
- C. Three or more
- D. Four or more

538 Which of the following is true for Category 1 tuberculosis ?

N Engl Med 2002;347:1420-5

- A. Positive sputum smear
- B. Negative sputum smear, patient seriously ill
- C. Patient has extrapulmonary TB & is seriously ill
- D. All of the above

539 Which of the following is true for Category 2 tuberculosis?

N Engl Med 2002;347:1420-5

- A. Positive sputum smear, patient relapsed
- B. Positive sputum smear, treatment failed
- C. Positive sputum smear, patient treated after default
- D. All of the above

- 540 Which of the following is true for Category 3 tuberculosis?
N Engl Med 2002;347:1420-5
A. Negative sputum smear
B. Abnormal radiograph, patient not seriously ill
C. Patient has extrapulmonary TB but is not seriously ill
D. All of the above
- 541 A negative sputum smear is defined as at least how many new sputum smears negative for AFB ?
N Engl Med 2002;347:1420-5
A. 1
B. 2
C. 3
D. 4
- 542 Which of the following is false for M. tuberculosis relapse ?
N Engl Med 2002;347:1420-5
A. Bacteriologically positive TB
B. Patient previously treated for TB
C. Patient declared cured or completed treatment
D. None of the above

"Relapse" cases were those who had bacteriologic evidence of recurrence of M. tuberculosis infection during the follow-up period after completion of anti-TB treatment.

- 543 A tuberculosis patient is called "Defaulter" if treatment has been interrupted for ?
N Engl J Med 2002;347:1421
A. 15 days consecutively
B. 30 days consecutively
C. 45 days consecutively
D. Two or more consecutive months

"Default" cases were those with interruption of treatment for at least two consecutive months.

- 544 "Failure" cases are those with persistent sputum (+) AFB &/or M. tuberculosis culture how many months of anti-TB treatment ?
Harrison's 18th Ed. 1354
A. 2
B. 3
C. 5
D. 6

"Failure" cases are those with persistent sputum (+) AFB &/or M. tuberculosis culture after three months of anti-TB treatment.

- 545 "Expire" cases are those ?
A. Who died without receiving anti-TB treatment
B. Who died during anti-TB treatment
C. Who died after anti-TB treatment
D. Any of the above

"Expire" cases were those who died during anti-TB treatment.

- 546 Which of the following anti-tubercular drugs was used first to treat tuberculosis ?
Harrison's 18th Ed. 1352
A. Streptomycin
B. Para-aminosalicylic acid (PAS)
C. Isoniazid

D. Pyrazinamide

In mid-1940s, streptomycin was used for treatment of tuberculosis. Para-aminosalicylic acid (PAS) and isoniazid were the next drugs. Pyrazinamide was first used in the 1950s. In early 1970s, with the discovery of Rifampin, the concept of short-course chemotherapy started.

- 547 Which of the following places is related to the first documentation of streptomycin as anti-tubercular drug ?
N Engl J Med 2012;367:931-6
A. Yale University
B. Rutgers University
C. Columbia University
D. University of Utrecht

It was at Rutgers University that Selman Waksman (1888 - 1973) discovered several antibiotics, including actinomycin, clavacin, streptothricin, grisein, neomycin, fradycin, candidin, candidin, and others. Waksman, along with Albert Schatz (1920 - 2005), discovered streptomycin. For this discovery, Waksman received the Nobel Prize for Medicine in 1952.

- 548 Which of the following anti-tubercular drug was developed after rifampin ?
N Engl J Med 2012;367:931-6
A. Thiacetazone
B. Pyrazinamide
C. Ethambutol
D. Cycloserine

The years in which various anti-tubercular drugs were developed are thiacetazone (1948), para-aminosalicylic acid (1948), isoniazid (1951), pyrazinamide (1952), cycloserine (1952), ethionamide (1956), rifampin (1957), and ethambutol (1962).

- 549 Which of the following is not a first-line antitubercular agent ?
Harrison's 18th Ed. 1352
A. Streptomycin
B. Isoniazid
C. Rifampin
D. Pyrazinamide

First-line agents for treatment of tuberculosis are isoniazid, rifampin, pyrazinamide and ethambutol. Second-line drugs are streptomycin, kanamycin, amikacin, capreomycin, ethionamide, cycloserine, PAS and fluoroquinolones. Other drugs of unproven efficacy that have been used in the treatment of patients with resistance to most of first- and second-line agents include clofazimine, amoxicillin/clavulanic acid, and linezolid.

- 550 A full course of therapy (completion of treatment) is defined more accurately by ?
Harrison's 18th Ed. 1352
A. Total number of doses taken
B. Length of treatment
C. Type of drugs used
D. All of the above

A full course of therapy (completion of treatment) is defined more accurately by the total number of doses taken than by the length of treatment.

- 551 The preferred method of monitoring response to treatment for pulmonary tuberculosis is ?
Harrison's 18th Ed. 1354
A. X-Ray chest
B. Bacteriologic evaluation
C. ADA level
D. Interferon-gamma level

Bacteriologic evaluation is the preferred method of monitoring response to treatment for tuberculosis.

- 552 With the recommended ATT regimen, >80% of patients will have negative sputum cultures at the end of ?**

Harrison's 18th Ed. 1354

- A. First month
- B. Second month
- C. Third month
- D. Fourth month

With the recommended regimen, >80% of patients will have negative sputum cultures at the end of the second month of treatment.

- 553 With the recommended ATT regimen, virtually all patients will have negative sputum cultures at the end of ?**

Harrison's 18th Ed. 1354

- A. First month
- B. Second month
- C. Third month
- D. Fourth month

By the end of 3rd month, almost all patients should be culture-negative with recommended ATT regimen.

- 554 To prevent isoniazid-related neuropathy, which of the following is helpful ?**

Harrison's 18th Ed. 1352

- A. Thiamine
- B. Ascorbic acid
- C. Pyridoxine
- D. Pantothenic acid

To prevent isoniazid-related neuropathy, pyridoxine (10 to 25 mg/day) should be added to the antitubercular regimen.

- 555 Patient is considered as 'Defaulter' if ATT treatment has been interrupted for what duration ?**

N Engl Med 2002;347:1420-5

- A. 15 days
- B. One month
- C. Two or more consecutive months
- D. Any of the above

- 556 Treatment failure & drug resistance should be suspected when a patient's sputum cultures remain positive at or beyond ?**

Harrison's 18th Ed. 1354

- A. 1 months
- B. 2 months
- C. 3 months
- D. 4 months

When a patient's sputum cultures remain positive at ≥ 3 months, treatment failure and drug resistance should be suspected.

- 557 Treatment failure should be suspected when a patient's sputum smears remain positive beyond ?**

Harrison's 17th Ed. 1016

- A. 2 months
- B. 3 months
- C. 4 months
- D. 5 months

AFB smears positive after 5 months are indicative of treatment failure.

- 558 Hyperuricemia is the adverse effect of which of the following anti-tubercular drug ?**

Harrison's 18th Ed. 1354

- A. Isoniazid
- B. Ethionamide
- C. Pyrazinamide
- D. Rifampin

Hyperuricemia and arthralgia may be caused by pyrazinamide. Pyrazinamide should be stopped if the patient develops gouty arthritis.

- 559 Autoimmune thrombocytopenia is the adverse effect of which of the following anti-tubercular drug ?**

Harrison's 18th Ed. 1354

- A. Isoniazid
- B. Rifampin
- C. Pyrazinamide
- D. Ethambutol

Individuals who develop autoimmune thrombocytopenia secondary to rifampin therapy should not receive the drug thereafter.

- 560 Optic neuritis is the adverse effect of which of the following anti-tubercular drug ?**

Harrison's 18th Ed. 1354

- A. Isoniazid
- B. Rifampin
- C. Pyrazinamide
- D. Ethambutol

Optic neuritis with ethambutol is an indication for permanent discontinuation of this drug.

- 561 Which of the following is an indication for permanent discontinuation of the drug ?**

Harrison's 18th Ed. 1354

- A. Pyrazinamide - if patient develops gouty arthritis
- B. Rifampin - if patient has autoimmune thrombocytopenia
- C. Ethambutol - if patient has optic neuritis
- D. All of the above

- 562 Optimal treatment duration recommended when TB bacilli is resistant to all of the first-line agents is ?**

Harrison's 18th Ed. 1354

- A. 12 months
- B. 15 months
- C. 20 months
- D. Life long

Optimal treatment duration recommended when TB bacilli is resistant to all of the first-line agents is 20 months with a combination of four second-line drugs, including one injectable agent.

- 563 Which of the following statements about tuberculosis treatment in HIV-infected patients is false ?**

Harrison's 18th Ed. 1355

- A. Standard treatment is equally efficacious in HIV (-) & HIV (+) patients
- B. Increased frequency of paradoxical reactions
- C. Drug interactions between ART and Isoniazid
- D. Occurrence of Immune reconstitution inflammatory syndrome (IRIS)

Standard ATT treatment is efficacious in HIV (+) & HIV (-) patients. There is increased frequency of paradoxical reactions, drug interactions between antiretroviral therapy and rifamycins, and development of rifampin monoresistance. Immune reconstitution inflammatory syndrome (IRIS) refers to exacerbations in symptoms, signs and laboratory or radiographic manifestations of tuberculosis associated with administration of ART.

564 Which of the following about immune reconstitution inflammatory syndrome (IRIS) is false ?

Harrison's 18th Ed. 1355

- A. Common in patients with advanced immunosuppression
- B. Common in patients with extrapulmonary tuberculosis
- C. Due to immune response elicited by antigens released from killed bacilli during effective chemotherapy
- D. None of the above

IRIS is more common among patients with advanced immunosuppression and extrapulmonary tuberculosis. It is due to an immune response elicited by antigens released from killed bacilli during effective chemotherapy.

565 "Paradoxical reaction" to ATT occur when ?

Harrison's 18th Ed. 1355

- A. Drug resistance is expected
- B. HAART regimen is administered
- C. Retreatment of defaulters is begun
- D. Any of the above

Exacerbations in symptoms, signs, and laboratory or radiographic manifestations of tuberculosis termed paradoxical reactions have been associated with the administration of HAART regimens.

566 9 to 12 month antitubercular regimen is still recommended for ?

Harrison's 18th Ed. 1356

- A. Children with tuberculous meningitis
- B. Children with miliary tuberculosis
- C. Children with bone or joint tuberculosis
- D. All of the above

American Academy of Pediatrics recommends that children with bone and joint tuberculosis, tuberculous meningitis, or miliary tuberculosis receive 9-12 months of treatment.

567 Which of the following anti-tubercular drug is contraindicated in pregnancy ?

Harrison's 18th Ed. 1356

- A. Isoniazid
- B. Rifampin
- C. Pyrazinamide
- D. Streptomycin

Pregnant women should receive ATT for 9 months with isoniazid & rifampin supplemented by ethambutol for first 2 months. WHO recommends routine use of pyrazinamide in pregnant women. Streptomycin is contraindicated in pregnancy because it causes eighth-cranial-nerve damage in the fetus.

568 BCG was derived from an attenuated strain of ?

Harrison's 18th Ed. 1356

- A. M. bovis
- B. M. tuberculosis
- C. M. intercellulare
- D. Any of the above

BCG was derived from an attenuated strain of M. bovis & was first administered to humans in 1921.

569 Scar formation & healing following BCG vaccination occurs within ?

Harrison's 18th Ed. 1356

- A. 1 month
- B. 2 months
- C. 3 months
- D. 4 months

The local tissue response following BCG vaccination begins 2 to 3 weeks, with scar formation and healing within 3 months.

570 Which of the following anti-tubercular drug interacts with glucocorticoids ?

Harrison's 16th Ed. 947 Table 149-2

- A. Isoniazid
- B. Rifampin
- C. Pyrazinamide
- D. Ethambutol

Following antimycobacterial agents have no or minimal effects on other drugs: amikacin, azithromycin, capreomycin, ethambutol, streptomycin, pyrazinamide.

571 Development of drug-resistant tuberculosis is invariably the result of ?

Harrison's 18th Ed. 1354

- A. Genetic factors
- B. Virulence of tubercular bacteria
- C. Monotherapy
- D. Host resistance

Development of drug-resistant TB is invariably the result of monotherapy (failure to prescribe at least two drugs to which tubercle bacilli are susceptible or of the patient to take properly prescribed therapy).

572 Tuberculin skin test (TST) was first introduced in ?

Lancet Infect Dis 2004;4:761-76

- A. 1890
- B. 1915
- C. 1942
- D. 1956

First introduced in 1890, tuberculin skin test (TST) to diagnose latent tuberculosis is the oldest diagnostic test in use.

573 Cellular mechanism responsible for tuberculin skin test (TST) reactivity is ?

Harrison's 18th Ed. 1344

- A. Previously sensitized CD4+ T lymphocytes
- B. Previously sensitized CD8+ T lymphocytes
- C. Previously sensitized CD4+ & CD8+ T lymphocytes
- D. Previously sensitized macrophages

Delayed-type hypersensitivity reaction (DTH) to M. tuberculosis is the basis of tuberculin skin test (TST). Cellular mechanisms responsible for TST reactivity are related mainly to previously sensitized CD4+ T lymphocytes, which are attracted to the skin-test site.

574 Which of the following statements is false ?

Harrison's 18th Ed. 1344

- A. TST-positive persons are less susceptible to a new M. tuberculosis infection
- B. Cases of active tuberculosis have strongly positive TST
- C. Latent or active tuberculosis may not confer fully protective immunity
- D. None of the above

575 In Mantoux test, transverse diameter in millimeters of which of the following is measured ?

Harrison's 18th Ed. 1357

- A. Induration
- B. Erythema
- C. Ulceration
- D. Any of the above

In Mantoux test, reactions are read at 48 to 72 hours as the transverse diameter in millimeters of "induration". The diameter of erythema is not considered.

576 For persons with a very low risk of developing tuberculosis if infected, a cutoff positive PPD skin test is ?

Harrison's 18th Ed. 1357

- A. 5 mm
- B. 10 mm
- C. 15 mm
- D. 20 mm

For persons with a very low risk of developing tuberculosis if infected, a cutoff of 15 mm is considered as a positive reaction.

577 For close contacts of infectious tuberculosis cases, a cutoff positive PPD skin test is ?

Harrison's 18th Ed. 1357

- A. 5 mm
- B. 10 mm
- C. 15 mm
- D. 20 mm

578 In HIV infection, a cutoff positive PPD skin test is ?

Harrison's 18th Ed. 1357

- A. 5 mm
- B. 10 mm
- C. 15 mm
- D. 20 mm

Positive reactions for close contacts of infectious cases, persons with HIV infection, persons receiving drugs that suppress the immune system, and previously untreated persons whose chest radiograph is consistent with healed tuberculosis are defined as an area of induration ≥ 5 mm in diameter.

579 Interferon-gamma is produced by ?

Lancet Infect Dis 2004;4:761-76

- A. Macrophages
- B. T cells
- C. Dendritic cells
- D. All of the above

Interferon-gamma assays are based on the principle that T cells of individuals sensitised with tuberculosis antigens produce interferon gamma when they reencounter mycobacterial antigens. A high level of interferon-gamma production is presumed to be indicative of tuberculosis infection.

580 Interferon-gamma assays is useful for ?

Lancet Infect Dis 2004;4:761-76

- A. Diagnosis of latent tuberculosis
- B. Diagnosis of active tuberculosis
- C. Distinguishing between NTM & M tuberculosis infection
- D. All of the above

Interferon-gamma assays is useful for diagnosis of latent tuberculosis, diagnosis of active tuberculosis, distinguishing between NTM & M tuberculosis infection, differentiating between M

tuberculosis infection & previous BCG vaccination, serving as a correlate of protective immunity & for assessment of vaccine efficacy, prediction of reactivation disease among those with latent tuberculosis, and monitoring treatment response.

581 Tuberculosis affects which bone more frequently ?

Harrison's 18th Ed. 1347

- A. Spine
- B. Metaphyses of long bones
- C. Ribs
- D. Sternum

Tuberculosis and brucellosis affect the spine more often than other bones. Thoracic spine is involved most commonly in tuberculous spondylitis (Pott's disease).

582 Streptomycin is the drug of choice in initial therapy for ?

Harrison's 18th Ed. 1299

- A. Tularemia
- B. Plague
- C. Brucellosis
- D. All of the above

Streptomycin is drug of choice in initial therapy for tularemia, plague, glanders & brucellosis.

583 Which of the following is false about tubercular vertebral osteomyelitis ?

Harrison's 18th Ed. 1298 Table 157-1

- A. Site mostly affected is dorsolumbar spine
- B. Diskitis is late
- C. Spinal canal compression common
- D. Psoas abscess likely

Diskitis is early in tuberculosis while it is late in brucellosis. Also, in brucellosis, the spinal canal compression and psoas abscess are rare.

584 Which of the following antimycobacterial agents have no or minimal effects on other drugs ?

Harrison's 17th Ed. 1032

- A. Amikacin
- B. Ethambutol
- C. Pyrazinamide
- D. All of the above

Antimycobacterials that have no / minimal effects on other drugs are amikacin, azithromycin, capreomycin, ethambutol, streptomycin, & pyrazinamide.

585 Which of the following is not a "first-line essential anti-tuberculous agent" ?

Harrison's 18th Ed. 1373-75

- A. Rifampin
- B. Isoniazid
- C. Streptomycin
- D. Pyrazinamide

Four first-line essential antituberculous agents are rifampin, isoniazid, ethambutol & pyrazinamide.

586 Which of the following is a "first-line supplemental anti-tuberculous agent" ?

Harrison's 18th Ed. 1376

- A. Rifampin
- B. Isoniazid
- C. Streptomycin

D. Pyrazinamide

First-line "supplemental" agents include rifabutin, rifapentine, and streptomycin.

587 Which of the following is not a "second-line anti-tuberculous drug" ?

Harrison's 18th Ed. 1377

- A. Levofloxacin
- B. Ethionamide
- C. Ethambutol
- D. Amikacin

Second-line antituberculous drugs are para-aminosalicylic acid (PAS), ethionamide, cycloserine, amikacin, kanamycin, capreomycin, and fluoroquinolones.

588 Which of the following drugs is bacteriostatic against resting bacilli & bactericidal against rapidly multiplying organisms, both extracellularly & intracellularly ?

Harrison's 18th Ed. 1373

- A. Rifampin
- B. Isoniazid
- C. Ethambutol
- D. Pyrazinamide

589 Isoniazid is bactericidal against ?

Harrison's 18th Ed. 1373

- A. Resting bacilli
- B. Rapidly multiplying bacilli
- C. Injured bacilli
- D. All of the above

Isoniazid is bacteriostatic against resting bacilli and bactericidal against rapidly multiplying organisms, both extracellularly and intracellularly.

590 Isoniazid-associated hepatitis increases in ?

Harrison's 18th Ed. 1374

- A. Age
- B. Daily alcohol consumption
- C. Concomitant rifampin administration
- D. All of the above

591 Isoniazid-associated hepatitis increases in ?

Harrison's 18th Ed. 1374

- A. HIV infection
- B. Pregnant women
- C. Postpartum period
- D. All of the above

Isoniazid-associated hepatitis is idiosyncratic and increases in incidence with age, daily alcohol consumption, concomitant rifampin administration, and HIV infection as well as in women who are pregnant or in postpartum period.

592 Isoniazid should be discontinued when there is asymptomatic elevation of ALT level that exceed how many times the upper limit of normal ?

Harrison's 18th Ed. 1374

- A. Two times
- B. Three times
- C. Five times
- D. Seven times

CDC & ATS recommend that isoniazid should be discontinued when there occurs an asymptomatic elevation of ALT level that exceeds five times upper limit of normal or when ALT is three times the upper limit of normal along with hepatitis symptoms or jaundice.

593 Rifampin is a semisynthetic derivative of ?

Harrison's 18th Ed. 1374

- A. Streptomyces victorii
- B. Streptomyces griseus
- C. Streptomyces mediterranei
- D. Streptomyces perii

Rifampin is a semisynthetic derivative of Amycolatopsis rifamycinica formerly known as Streptomyces mediterranei.

594 Rifampin is also active against ?

Harrison's 18th Ed. 1374

- A. Legionella spp.
- B. M. kansasii
- C. M. marinum
- D. All of the above

Rifampin is also active against some gram-positive & gram-negative bacteria, Legionella spp., M. kansasii, and M. marinum.

595 Which of the following body fluids is turned red-orange in color by rifampin ?

Harrison's 18th Ed. 1374

- A. Urine
- B. Saliva
- C. Sputum
- D. All of the above

Rifampin turns urine, saliva, sputum and tears to a red-orange color.

596 Which of the following is best related to rifampin ?

Harrison's 18th Ed. 1374

- A. Aminosalicyclic acid
- B. Sulphonylurea
- C. Macrocytic antibiotic
- D. Trimethoprim

Rifampin is a fat-soluble complex macrocytic antibiotic.

597 Which of the following is false about rifampin ?

Harrison's 18th Ed. 1374

- A. Intracellular & extracellular bactericidal activity
- B. Blocks RNA synthesis
- C. Inhibits DNA-dependent RNA polymerase
- D. Water-soluble

Rifampin is a fat-soluble and has intracellular & extracellular bactericidal activity. It blocks RNA synthesis by specifically binding & inhibiting DNA-dependent RNA polymerase.

598 Most common adverse effect of rifampin is ?

Harrison's 18th Ed. 1375

- A. Skin rash
- B. Hepatitis
- C. Gastrointestinal upset
- D. Thrombocytopenia

Most common adverse effect of rifampin is gastrointestinal upset. It causes hepatocellular injury when given in combination with isoniazid or pyrazinamide. Skin rash, hemolytic anemia, thrombocytopenia, and immunosuppression of infrequent.

599 Rifampin decreases half-life of which of the following drugs ?

Harrison's 18th Ed. 1375

- A. Digoxin
- B. Prednisone
- C. HIV protease inhibitors
- D. All of the above

Rifampin is a potent inducer of hepatic microsomal enzymes and decreases half-life of digoxin, warfarin, prednisone, cyclosporine, methadone, oral contraceptives, clarithromycin, HIV protease inhibitors, HIV nonnucleoside reverse transcriptase inhibitors, and quinidine.

600 Among the first-line drugs, which one is the least potent against M. tuberculosis ?

Harrison's 18th Ed. 1375

- A. Isoniazid
- B. Rifampin
- C. Ethambutol
- D. Pyrazinamide

Among first-line drugs, ethambutol is the least potent against M. tuberculosis.

601 Primary mechanism of action of ethambutol relates best to ?

Harrison's 18th Ed. 1375

- A. DNA-dependent RNA polymerase
- B. Catalase-peroxidase reaction
- C. Arabinosyltransferase
- D. Ribosome

Ethambutol is a water-soluble compound (derivative of ethylenediamine), that is bacteriostatic only against mycobacteria like M. tuberculosis, M. marinum, M. kansasii, and MAC organisms. Primary mechanism of action is inhibition of an arabinosyltransferase that mediates the polymerization of arabinose into arabinogalactan within mycobacterial cell wall.

602 Retrobulbar optic neuritis as a complication of ethambutol therapy results in loss of vision for which colour ?

Harrison's 18th Ed. 1375

- A. Red
- B. Blue
- C. Green
- D. Yellow

Retrobulbar optic neuritis due to ethambutol therapy results in reduced visual acuity, central scotoma, and loss of ability to see green. Optic neuritis with associated visual loss is reversible, but recovery may take >6 months.

603 Retrobulbar optic neuritis as a complication of ethambutol therapy can lead to ?

Harrison's 18th Ed. 1375

- A. Reduced visual acuity
- B. Central scotoma
- C. Loss of ability to see green
- D. All of the above

Retrobulbar optic neuritis involves papillomacular bundle of fibers & results in reduced visual acuity, central scotoma, and loss of ability to see green.

604 Perioral paresthesia and eosinophilia are adverse effects of which of the following drugs ?

Harrison's 17th Ed. 1035

- A. Isoniazid
- B. Rifampin
- C. Streptomycin

D. Pyrazinamide

Adverse effects of Streptomycin include renal toxicity (nonoliguric renal failure), ototoxicity (hearing loss & vestibular dysfunction), perioral paresthesia, eosinophilia, rash and drug fever.

605 Ototoxicity in patients receiving streptomycin include ?

Harrison's 18th Ed. 1376

- A. Hearing loss
- B. Vertigo
- C. Tinnitus
- D. All of the above

Ototoxicity in patients receiving streptomycin include both hearing loss and vestibular dysfunction like loss of balance, vertigo, and tinnitus.

606 Mean serum half-life of Rifabutin is ?

Harrison's 18th Ed. 1376

- A. 24 hours
- B. 45 hours
- C. 62 hours
- D. 78 hours

Slow clearance of rifabutin via hepatic metabolism & renal excretion results in mean serum half-life of 45 hours, which is much longer than 3- to 5-hour half-life of rifampin. Clarithromycin (not azithromycin) & fluconazole block hepatic metabolism of rifabutin with consequent increases in its serum levels.

607 "Pseudojaundice" is an adverse effect of ?

Harrison's 18th Ed. 1376

- A. Isoniazid
- B. Ethambutol
- C. Pyrazinamide
- D. Rifabutin

Yellow skin discoloration "pseudojaundice" may be rifabutin's adverse effect.

608 Which of the following antitubercular drug is not bacteriostatic ?

Harrison's 18th Ed. 1376

- A. Amikacin
- B. Ethionamide
- C. Pyrazinamide
- D. Ethambutol

Pyrazinamide is bactericidal to slowly metabolizing organisms located within the acidic environment of phagocyte or caseous granuloma.

609 Which of the following antitubercular drug is bactericidal ?

Harrison's 18th Ed. 1376

- A. Streptomycin
- B. Rifampin
- C. Pyrazinamide
- D. All of the above

610 Which of the following antitubercular drug acts only against extracellular M. tuberculosis ?

Harrison's 18th Ed. 1376

- A. Rifampin
- B. Isoniazid
- C. Streptomycin
- D. All of the above

Streptomycin and Amikacin are bactericidal for rapidly dividing extracellular mycobacteria but is ineffective in the acidic environment within the macrophage.

611 Resistance to rifampin results from spontaneous point mutations related to which of the following genes ?

Harrison's 18th Ed. 1375

- A. katG
- B. rpoV
- C. rpoB
- D. erp

Resistance to rifampin results from spontaneous point mutations that alter the beta subunit of the RNA polymerase (rpoB) gene.

612 Resistance to isoniazid is related to which gene ?

Harrison's 18th Ed. 1374

- A. katG
- B. rpoV
- C. rpoB
- D. erp

Most isoniazid-resistant strains have amino acid changes in the catalase-peroxidase gene (katG) or the promoter of a two-gene locus known as inhA.

613 Resistance to pyrazinamide is related to which gene ?

Harrison's 18th Ed. 1376

- A. katG
- B. rpoV
- C. rpoB
- D. pncA

Resistance to pyrazinamide is due to loss of pyrazinamidase activity preventing conversion of pyrazinamide to pyrazinoic acid. pncA gene encodes pyrazinamidase. All strains of M. bovis are naturally resistant to pyrazinamide and have a point substitution within the pncA gene.

614 Resistance to ethambutol is related to which gene ?

Harrison's 18th Ed. 1375

- A. katG
- B. rpoV
- C. embB
- D. pncA

Nine genes are known to be linked to resistance to first-line drugs: katG, inhA, aphC, and kasA (INH resistance); rpoB (RIF resistance); rpsL and rrs (streptomycin STR resistance); embB (that encodes for arabinosyltransferase, ethambutol resistance) & pncA (pyrazinamide resistance). Three selected codons (rpoB531, rpoB526, and katG315) allows identification of 90% of MDR-TB cases.

615 Which of the following anti-tuberculous agents is not available for parenteral use ?

Harrison's 17th Ed. 1034-5

- A. Rifampin
- B. Isoniazid
- C. Streptomycin
- D. Pyrazinamide

Pyrazinamide is not available in a parenteral formulation.

616 Active form of Pyrazinamide is ?

Harrison's 18th Ed. 1375

- A. Pyrazoic acid
- B. Pyrazine acid
- C. Pyranoic acid
- D. Pyrazinoic acid

617 Pyrazinamide is converted to its active form by ?

Harrison's 18th Ed. 1376

- A. Liver
- B. Kidney
- C. Skin
- D. Tubercle bacillus

Pyrazinamide is a prodrug & is converted by tubercle bacillus mycobacterial pyrimidase to the active form pyrazinoic acid.

618 Which of the following anti-tuberculous agent is a derivative of isonicotinic acid ?

Harrison's 17th Ed. 1034

- A. Ethionamide
- B. Isoniazid
- C. Pyrazinamide
- D. All of the above

Like isoniazid and pyrazinamide, ethionamide is a derivative of isonicotinic acid. Isoniazid is the hydrazide of isonicotinic acid.

619 Which of the following antimycobacterial agents need no change in dosage in patients with hepatic disease ?

Harrison's 17th Ed. 1032, Table 161-1

- A. Rifampin
- B. Rifabutin
- C. Rifapentine
- D. All of the above

Adjustment of dosage of Rifabutin is not needed in elderly patients and in patients with reduced hepatic or renal function.

620 Which of the following antimycobacterial agents has no evidence of risk when used in pregnancy ?

Harrison's 17th Ed. 1032, Table 161-1

- A. Rifampin
- B. Rifabutin
- C. Rifapentine
- D. All of the above

621 "DOTS" stands for ?

N Engl Med 2002;347:1420-5

- A. Directly observed treatment - supervised
- B. Directly observed treatment - short course
- C. Directly observed treatment - safe
- D. Directly observed treatment - sure

622 Which of the following is not an element of WHO DOTS strategy ?

Lancet 2005;365:1239-45

- A. Political commitment
- B. Case detection by sputum microscopy
- C. Specific therapy for patients with drug-resistant TB
- D. Standard recording and reporting system

DOTS consists of five main elements: political commitment; case detection by sputum microscopy; directly observed therapy of a standard short-course regimen; uninterrupted supply of all essential drugs; and a standard recording and reporting system that allows assessment of treatment results and overall programme performance. DOTS does not include specific therapy for patients with drug-resistant tuberculosis.

623 Tubercular markers in pleural fluid include ?*Harrison's 18th Ed. 1346*

- A. Adenosine deaminase > 45 IU/L
- B. Interferon γ > 140 pg/mL
- C. Positive polymerase chain reaction (PCR) for TB DNA
- D. All of the above

TB markers in pleural fluid include adenosine deaminase > 45 IU/L, interferon gamma > 140 pg/mL and positive polymerase chain reaction (PCR) for TB DNA.

624 Pyuria in the absence of bacteriuria (sterile pyuria) indicates infection with ?*Harrison's 16th Ed. 1718*

- A. *C. trachomatis*
- B. *U. urealyticum*
- C. *Mycobacterium tuberculosis*
- D. All of the above

*Pyuria in the absence of bacteriuria (sterile pyuria) may indicate infection with *C. trachomatis*, *U. urealyticum*, *Mycobacterium tuberculosis* or fungi. Sterile pyuria may be found in noninfectious urologic conditions such as calculi, anatomic abnormality, nephrocalcinosis, vesicoureteral reflux, interstitial nephritis, or polycystic disease.*

625 Bilateral hilar adenopathy on chest x-ray indicates ?*Harrison's 16th Ed. 2023*

- A. Sarcoidosis
- B. Lymphoma
- C. Tuberculosis
- D. All of the above

626 Bilateral hilar adenopathy on chest x-ray indicates ?*Harrison's 16th Ed. 2023*

- A. Coccidioidomycosis
- B. Brucellosis
- C. Bronchogenic carcinoma
- D. All of the above

Bilateral hilar adenopathy is observed in sarcoidosis, lymphoma, tuberculosis, coccidioidomycosis, brucellosis, and bronchogenic carcinoma.

627 Poncet's disease refers to ?*Harrison's 18th Ed. 2846*

- A. Polyarthritis in disseminated tuberculosis
- B. Anterior uveitis in disseminated tuberculosis
- C. Posterior uveitis in disseminated tuberculosis
- D. Meningitis in disseminated tuberculosis

Poncet's disease is a reactive symmetric form of polyarthritis that affects persons with visceral or disseminated tuberculosis. No mycobacteria are found in the joints, and symptoms resolve with antituberculous therapy.

628 Which of the following drug resistance is observed in *M. tuberculosis* ?

- A. Acquired resistance
- B. Transmitted resistance
- C. Amplified resistance
- D. All of the above

Drug resistance epidemics are caused by three independent, but interacting processes - Conversion of wild-type to drug-resistant cases (acquired resistance), transmission of drug-resistant strains to uninfected individuals (transmitted resistance), and progressive acquisition by drug-resistant strains of resistance to more drugs during treatment (amplified resistance).

629 Phenomenon of transmission of drug resistant *M. tuberculosis* to new patients leading to drug resistance at the onset is called ?

- A. In-situ resistance
- B. Primary resistance
- C. Adhered resistance
- D. Any of the above

A patient with acquired drug resistance may transmit resistant strains to another individual. Subsequent transmission leads to tuberculosis in new patients that is drug resistant at the onset, a phenomenon known as primary resistance. Primary resistance includes natural resistance (not associated with contact to drug) and the resistance occurring as a result of exposure to a drug-resistant strain from another patient.

630 The global prevalence in new patients of MDR-TB is ?

- A. < 1 %
- B. < 3 %
- C. < 5 %
- D. < 8 %

The global prevalence in new patients of MDR-TB is still below 3%.

631 Drug resistant tuberculosis refers to ?*BMJ 2008;337:a1110*

- A. Resistance to any first line Anti TB drug
- B. Resistance to at least INH & rifampicin
- C. Resistance to at least INH, rifampicin & fluoroquinolone
- D. Resistance to at least INH, rifampicin, fluoroquinolone & a second line injectable agent

Tuberculosis that is resistant to any first line antituberculosis drug is called drug resistant tuberculosis.

632 Multidrug resistant tuberculosis (MDR-TB) refers to ?*BMJ 2008;337:a1110*

- A. Resistance to any first line Anti TB drug
- B. Resistance to at least INH & rifampicin
- C. Resistance to at least INH, rifampicin & fluoroquinolone
- D. Resistance to at least INH, rifampicin, fluoroquinolone & a second line injectable agent

Tuberculosis that is resistant to at least isoniazid and rifampicin is called Multidrug resistant tuberculosis (MDR-TB).

633 Extensively drug resistant tuberculosis (XDR-TB) refers to ?*BMJ 2008;337:a1110, N Engl J Med 2008;359:563-74.*

- A. Resistance to any first line Anti TB drug
- B. Resistance to at least INH & rifampicin
- C. Resistance to at least INH, rifampicin & fluoroquinolone
- D. Resistance to at least INH, rifampicin, fluoroquinolone & a second line injectable agent

*Extensively drug resistant tuberculosis (XDR-TB) refers to tuberculosis that is resistant to at least isoniazid and rifampicin and also to a fluoroquinolone and a second line injectable agent (amikacin, capreomycin, or kanamycin). OR extensively drug-resistant tuberculosis was defined as *M. tuberculosis* isolates that are resistant to isoniazid, rifampin, and members of three of the six classes of secondline drugs.*

634 Which of the following is not an antitubercular drug ?*BMJ 2008;337:a1110*

- A. Prothionamide
- B. Terizidone
- C. Cyclozidone
- D. Thioacetazone

Second line oral antitubercular drugs are ethionamide, prothionamide, cycloserine, terizidone, para-aminosalicylic acid, and thioacetazone.

Chapter 210. Malaria

635 Anopheles in Greek means ?

- A. Dangerous
- B. Black
- C. Useless
- D. Suffering

Word Anopheles is derived from Greek & it means useless (an-, without + ophelos, advantage, use).

636 Who demonstrated the existence of Plasmodium in the stomach of the Anopheles mosquito ?

- A. Garnham
- B. Giovanni Grassi
- C. Ronald Ross
- D. Laveran

In 1898, Ronald Ross demonstrated the existence of Plasmodium in the stomach of the Anopheles mosquito. He won the Nobel Prize (Physiology or Medicine) in 1902.

637 Who showed that human malaria could only be transmitted by Anopheles mosquitoes ?

- A. Giovanni Grassi
- B. Laveran
- C. Ronald Ross
- D. Garnham

Italian zoology professor, Giovanni Grassi, showed that human malaria could only be transmitted by Anopheles mosquitoes and proposed an exerythrocytic stage in the life cycle, later confirmed by Short, Garnham, Covell and Shute (1948), who found Plasmodium vivax in human liver.

638 Which of the following causes malignant tertian malaria ?

- A. P. falciparum
- B. P. vivax
- C. P. ovale
- D. P. malariae

639 Which of the following causes benign quartan malaria ?

- A. P. falciparum
- B. P. vivax
- C. P. ovale
- D. P. malariae

The four species of Plasmodium that attack humans are P. falciparum (malignant tertian malaria), P. vivax & P. ovale (benign tertian malaria), & P. malariae (benign quartan malaria).

640 Name malaria is derived from Italian “mala - aria” meaning ?

- A. Stagnation
- B. Bad air
- C. Dense forest
- D. Windy

Name malaria comes from Italian “mala - aria” meaning bad air (poisonous vapours of swamps).

641 Who first employed the tincture of the cinchona bark for treating malaria ?

- A. Gilroy
- B. Konradsen
- C. Utzinger

D. Huan del Vego

In 1640, Huan del Vego first employed the tincture of cinchona bark for treating malaria. Thompson (1650) introduced this “Jesuits’ bark” to England: Its first recorded use was by Dr John Metford of Northampton (1656). Morton (1696) presented the first detailed description of the clinical picture of malaria & of its treatment with cinchona. Gize (1816) studied extraction of crystalline quinine from cinchona bark & Pelletier & Caventou (1820) in France extracted pure quinine alkaloids, which they named quinine and cinchonine.

642 Inoculation of plasmodial sporozoites by female anopheline mosquito and asexual reproduction in hepatic parenchymal cells is called ?

Harrison’s 18th Ed. 1688

- A. Intrahepatic schizogony
- B. Preerythrocytic schizogony
- C. Preerythrocytic merogony
- D. All of the above

643 A single sporozoite eventually may produce daughter merozoites numbering ?

Harrison’s 18th Ed. 1688

- A. 100 to 1000
- B. 1000 to 3000
- C. 3000 to 8000
- D. 10,000 to >30,000

A single sporozoite eventually may produce 10,000 to >30,000 daughter merozoites.

644 Merozoites liberated into bloodstream due to bursting of infected liver cells multiply 6- to 20 fold every ?

Harrison’s 18th Ed. 1688

- A. 3 - 6 hours
- B. 12 - 24 hours
- C. 48 - 72 hours
- D. Any of the above

Swollen infected liver cell bursts to discharge motile merozoites into bloodstream. These invade RBCs & multiply 6- to 20 fold every 48-72 hours.

645 Symptomatic stage of the malarial infection begins when parasite density is about ?

Harrison’s 18th Ed. 1688

- A. ~ 10 / μ L
- B. ~ 50 / μ L
- C. ~ 100 / μ L
- D. ~ 150 / μ L

When parasites reach densities of ~50/ μ L of blood, symptomatic stage of the infection begins.

646 Hypnozoites of P. vivax and P. ovale are found in ?

Harrison’s 18th Ed. 1688

- A. Anopheles mosquito
- B. RBC
- C. Liver parenchymal cells
- D. Any of the above

In P. vivax and P. ovale infections, some of the intrahepatic forms do not divide immediately but remain dormant from 3 weeks to a year or longer before reproduction begins. These dormant forms, or hypnozoites, are the cause of the relapses.

647 ‘Ookinete’ stage in life cycle of Plasmodium is found in ?

Harrison’s 18th Ed. 1689

- A. Hepatic parenchymal cell

- B. Red blood cells (RBCs)
- C. Mosquito's midgut
- D. Mosquito's salivary gland

Male & female gametocytes form a zygote in female anopheline mosquito midgut which matures into an ookinete, which penetrates and encysts in the mosquito's gut wall. Oocyst expands by asexual division until it bursts to liberate motile sporozoites which migrate in hemolymph to salivary gland of mosquito to await inoculation into another human at the next feeding.

- 648

Intraerythrocytic life cycle is of about 48-hour duration for ?
Harrison's 18th Ed. 1688
 - A. P. falciparum
 - B. P. vivax
 - C. P. ovale
 - D. All of the above
- 649

Intraerythrocytic life cycle is of about 48-hour duration for all except ?
Harrison's 18th Ed. 1688
 - A. P. falciparum
 - B. P. vivax
 - C. P. ovale
 - D. P. malariae

Intraerythrocytic life cycle is of 72-hour duration for P. malariae.

- 650

Malaria in human beings is caused by ?
Harrison's 18th Ed. 1688
 - A. Direct effects of RBC invasion
 - B. Destruction by the asexual parasite
 - C. Host's reaction
 - D. All of the above

Malaria in human beings is caused by the direct effects of RBC invasion and destruction by the asexual parasite and the host's reaction.

- 651

Schizont appears at which of the following time in the life cycle of the malarial parasite ?
Harrison's 18th Ed. 1688
 - A. Beginning of intrahepatic life cycle
 - B. Beginning of intraerythrocytic life cycle
 - C. End of intrahepatic life cycle
 - D. End of intraerythrocytic life cycle

By the end of 48-hour intraerythrocytic life cycle (72 hour for P. malariae), parasite has consumed nearly all hemoglobin & grown to occupy most of the RBC. It is then called a schizont.

- 652

Infected RBC's ruptures to release how many daughter merozoites ?
Harrison's 18th Ed. 1688
 - A. 6 - 30
 - B. 100 - 300
 - C. 300 - 800
 - D. 1000 - 3000

Following schizogony RBC's ruptures to release 6 - 30 daughter merozoites, each potentially capable of invading a new RBC and repeating the cycle.

- 653

After entry into bloodstream, merozoites invade erythrocytes to become ?
Harrison's 18th Ed. 1688
 - A. Trophozoites

- B. Schizonts
- C. Sporozoites
- D. Any of the above

After entry into the bloodstream, merozoites rapidly invade erythrocytes and become trophozoites.

- 654

In Plasmodium life cycle, which of the following is an invasive form ?
 - A. Sporozoite
 - B. Merozoite
 - C. Ookinete
 - D. All of the above

Three distinct invasive forms in Plasmodium life cycle are sporozoite, merozoite, and ookinete.

- 655

Duffy blood-group antigen Fy^a or Fy^b is related to ?
Harrison's 18th Ed. 1688
 - A. P. falciparum
 - B. P. vivax
 - C. P. ovale
 - D. P. malariae

Attachment of P. vivax merozoite is mediated via Duffy blood-group antigen Fy^a or Fy^b (RBC surface receptor). Most West Africans have Duffy-negative FyFy phenotype & are resistant to P. vivax malaria.

- 656

P. ovale is relatively unusual outside ?
Harrison's 18th Ed. 1688
 - A. Africa
 - B. Central America
 - C. Indian subcontinent
 - D. Oceania

P. falciparum predominates in Africa, New Guinea, and Haiti. P. vivax is more common in Central America. P. malariae is found in sub-Saharan Africa. P. ovale is relatively unusual outside Africa.

- 657

Hypoendemicity means parasitemia rates of ?
Harrison's 18th Ed. 1690
 - A. < 10 %
 - B. 11 - 50 %
 - C. 51 - 75 %
 - D. > 75 %

Endemicity is defined in terms of parasitemia rates or palpable-spleen rates in children aged 2 - 9 years as hypoendemic (<10%), mesoendemic (11-50%), hyperendemic (51-75%) & holoendemic (>75%).

- 658

Constant, frequent, year-round malarial infection is called ?
Harrison's 18th Ed. 1691
 - A. Perennial transmission
 - B. Global transmission
 - C. Stable transmission
 - D. Perpetual transmission

Constant, frequent, year-round malarial infection is termed stable transmission. In hypoendemic areas, where transmission is low, erratic, or focal, full protective immunity is not acquired, and symptomatic disease may occur at all ages. This is termed unstable transmission.

- 659

Transmission of malaria is directly proportional to ?
Harrison's 18th Ed. 1691
 - A. Density of vector
 - B. (Number of human bites per day per mosquito)²
 - C. (Probability of mosquito's surviving for 1 day)¹⁰

D. All of the above

Transmission of malaria is directly proportional to density of the vector, square of the number of human bites per day per mosquito, and tenth power of the probability of the mosquito's surviving for 1 day.

660 To transmit malaria, the mosquito must survive for ?

Harrison's 18th Ed. 1691

- A. > 1 day
- B. > 3 days
- C. > 5 days
- D. > 7 days

To transmit malaria, the mosquito must survive for >7 days.

661 Malarial parasite's life cycle that takes place within the mosquito (sporogony) lasts ?

Harrison's 18th Ed. 1691

- A. 3 - 7 days
- B. 5 - 10 days
- C. 8 - 12 days
- D. 8 - 30 days

Malarial parasite's life cycle that takes place within the mosquito - from gametocyte ingestion to subsequent inoculation (sporogony) lasts 8 - 30 days.

662 In Africa, the most effective mosquito vector of malaria is ?

Harrison's 18th Ed. 1691

- A. Anopheles stephensi
- B. Anopheles gambiae
- C. Anopheles costalis
- D. Anopheles sinensis

The most effective mosquito vector of malaria in Africa is Anopheles gambiae.

663 The entomologic inoculation rate is ?

Harrison's 18th Ed. 1691

- A. Number of sporozoite (+) mosquito bites/year
- B. Number of sporozoite (+) mosquito bites/person/year
- C. Number of sporozoite (+) mosquito bites/person
- D. Number of sporozoite (+) mosquito bites

Entomologic inoculation rate is the number of sporozoite-positive mosquito bites per person per year.

664 Malaria pigment is also called ?

Harrison's 18th Ed. 1691

- A. Hemoverdin
- B. Hemosiderin
- C. Hemophyte
- D. Hemozoin

Malarial parasite consumes hemoglobin. Potentially toxic heme is detoxified by polymerization to biologically inert hemozoin or the malaria pigment.

665 Cytoadherence in P. falciparum infection is mainly due to ?

Harrison's 18th Ed. 1691

- A. PfEMP1
- B. PfEMP2
- C. PfEMP3
- D. PfEMP4

In P. falciparum infections, membrane protuberances or "knobs" extrude a high-molecular-weight, antigenically variant, strain-specific erythrocyte membrane adhesive protein (PfEMP1) that mediates attachment to receptors on venular and capillary endothelium - cytoadherence.

666 In P. falciparum infections, "knobs" appear on RBC's surface how many hours after the cell's invasion ?

Harrison's 18th Ed. 1691

- A. 5 - 10 hours
- B. 12 - 15 hours
- C. 24 - 30 hours
- D. 36 - 48 hours

In P. falciparum infections, membrane protuberances or "knobs" appear on RBC's surface 12 - 15 hours after the cell's invasion.

667 In Plasmodium falciparum infection, which of the following microbial ligand interacts with host receptor Glycophorin A ?

Harrison's 17th Ed. Table 114-1

- A. Erythrocyte-binding protein 165 (EBA-165)
- B. Erythrocyte-binding protein 175 (EBA-175)
- C. Erythrocyte-binding protein 185 (EBA-185)
- D. Erythrocyte-binding protein 195 (EBA-195)

668 Vascular receptor that mediate cytoadherence in P. falciparum infection include all except ?

Harrison's 18th Ed. 1691

- A. Inter cellular adhesion molecule 1 (ICAM-1)
- B. Chondroitin sulfate B
- C. CD36
- D. PfEMP1

Vascular receptors that mediate cytoadherence in P. falciparum infection include inter cellular adhesion molecule 1 (ICAM-1) in brain, chondroitin sulfate B in placenta & CD36 in most other organs.

669 Which of the following processes is central to the pathogenesis of falciparum malaria ?

Harrison's 18th Ed. 1691

- A. Cytoadherence
- B. Rosetting
- C. Agglutination
- D. All of the above

The processes of cytoadherence, rosetting, and agglutination are central to the pathogenesis of falciparum malaria. They result in the sequestration of RBCs containing mature forms of the parasite in vital organs where they interfere with microcirculatory flow and metabolism and avoid host defense mechanism like splenic processing and filtration.

670 Process of P. falciparum infected RBCs adhering to uninfected RBCs is called ?

Harrison's 18th Ed. 1691

- A. Agglutination
- B. Cytoadherence
- C. Rosette
- D. All of the above

P. falciparum infected RBCs adhere to uninfected RBCs to form rosettes.

671 Process of P. falciparum infected RBCs adhering to other parasitized RBCs is called ?

Harrison's 18th Ed. 1691

- A. Agglutination
- B. Cytoadherence
- C. Rosette
- D. All of the above

Process of P. falciparum infected RBCs adhering to other parasitized RBCs is called agglutination.

- 672 Premunition refers to ?
Harrison's 18th Ed. 1691
- A. Infection without illness
 - B. Malarial prodrome
 - C. Malarial sequele
 - D. Repeated malarial infection

The state of malarial infection without illness is called premunition.

- 673 Which of the following has the least duration of intrahepatic phase ?
Harrison's 18th Ed. 1689 Table 210-1
- A. *P. falciparum*
 - B. *P. vivax*
 - C. *P. malariae*
 - D. *P. ovale*

Duration of intrahepatic phase for P. falciparum is 5.5 days, for P. vivax is 8 days, for P. ovale is 9 days and for P. malariae is 15 days.

- 674 Which of the following releases least number of merozoites per infected hepatocyte ?
Harrison's 18th Ed. 1689 Table 210-1
- A. *P. falciparum*
 - B. *P. vivax*
 - C. *P. malariae*
 - D. *P. ovale*

Number of merozoites released per infected hepatocyte is 30000 for P. falciparum , 10000 for P. vivax, 15000 for P. ovale and 15000 for P. malariae.

- 675 Which of the following has the longest duration of erythrocytic cycle ?
Harrison's 18th Ed. 1689 Table 210-1
- A. *P. falciparum*
 - B. *P. vivax*
 - C. *P. malariae*
 - D. *P. ovale*

Duration of erythrocytic cycle is 48 hours for P. falciparum, 48 hours for P. vivax, 50 hours for P. ovale and 72 hours for P. malariae.

- 676 Pigment colour of which of the following is “black” ?
Harrison's 18th Ed. 1689 Table 210-1
- A. *P. falciparum*
 - B. *P. vivax*
 - C. *P. malariae*
 - D. *P. ovale*

Pigment color is black in P. falciparum, yellow-brown in P. vivax, dark brown in P. ovale and brown-black in P. malariae.

- 677 Which of the following is not a “benign” human malaria ?
Harrison's 18th Ed. 1691
- A. *P. vivax*
 - B. *P. ovale*
 - C. *P. malariae*
 - D. *P. falciparum*

- 678 Which of the following has preference for older RBC's ?
Harrison's 18th Ed. 1691
- A. *P. falciparum*

- B. *P. vivax*
- C. *P. malariae*
- D. *P. ovale*

- 679 The level of parasitemia in *P. vivax*, *P. ovale*, and *P. malariae* seldom exceeds ?
Harrison's 18th Ed. 1691
- A. 2 %
 - B. 5 %
 - C. 8 %
 - D. 10 %

- 680 Total proportion of infected RBC's of >2% corresponds to ?
Harrison's 18th Ed. 1692
- A. 10⁶ parasites
 - B. 10⁸ parasites
 - C. 10¹⁰ parasites
 - D. 10¹² parasites

In malaria due to P. vivax, P. ovale, and P. malariae, sequestration does not occur, and all stages of the parasite's development are evident on PBF. P. vivax, P. ovale show a marked predilection for young RBCs, P. malariae attacks old cells and produces parasitemia that is seldom >2%. P. falciparum can invade erythrocytes of all ages and may be associated with very high levels of parasitemia.

- 681 Which of the following genetic disorders confers protection against death from falciparum malaria ?
Harrison's 18th Ed. 1691
- A. Sickle cell disease
 - B. Ovalocytosis
 - C. G6PD deficiency
 - D. All of the above

Sickle cell disease, hemoglobins C & E, hereditary ovalocytosis, thalassemias, and glucose-6-phosphate dehydrogenase (G6PD) deficiency confer protection against death from falciparum malaria.

- 682 In malarial immune individuals, serum levels of which of the following increase ?
Harrison's 18th Ed. 1692
- A. IgM
 - B. IgG
 - C. IgA
 - D. All of the above

Immune malarial individuals have a polyclonal increase in serum levels of IgM, IgG, and IgA, although much of this antibody is unrelated to protection.

- 683 The fever never becomes regular in ?
Harrison's 18th Ed. 1692
- A. *P. vivax*
 - B. *P. ovale*
 - C. *P. malariae*
 - D. *P. falciparum*

In classic malarial paroxysms, fever spikes, chills, & rigors is irregular at first. In falciparum malaria it may never become regular.

- 684 Death rate in adults with coma due to falciparum malaria is ?
Harrison's 18th Ed. 1692
- A. ~ 5 %
 - B. ~ 10 %

C. ~ 15 %

D. ~ 20 %

Death rates in cerebral malaria with coma due to falciparum malaria is ~20% among adults and 15% among children despite treatment.

685 Which of the following about cerebral malaria is false ?

Harrison's 18th Ed. 1692

- A. Diffuse symmetric encephalopathy
- B. Focal neurologic signs are unusual
- C. Pout reflex is uncommon
- D. Abdominal and cremasteric reflexes are absent

Cerebral malaria is a diffuse symmetric encephalopathy, focal neurologic signs are unusual. Signs of meningeal irritation are absent. Eyes may be divergent and a pout reflex is common. Abdominal and cremasteric reflexes are absent.

686 Hypoglycemia in malaria is due to ?

Harrison's 18th Ed. 1692

- A. Failure of hepatic gluconeogenesis
- B. Increased consumption of glucose by host & parasite
- C. Use of quinine & quinidine
- D. All of the above

Hypoglycemia in malaria is due to failure of hepatic gluconeogenesis & increase in consumption of glucose by host and malaria parasites. Quinine & quinidine are powerful stimulants of pancreatic insulin secretion.

687 Poor prognostic clinical features in severe falciparum malaria are all except ?

Harrison's 18th Ed. 1694 Table 210-3

- A. Hyperventilation
- B. Hyperthermia
- C. Anuria
- D. Seizures

688 Poor prognostic laboratory features in severe falciparum malaria are all except ?

Harrison's 18th Ed. 1694 Table 210-3

- A. Hypoglycemia
- B. Acidosis
- C. Hyperuricemia
- D. Hypercalcemia

Acidosis results from accumulation of organic acids and carries poor prognosis.

689 Which of the following is the best biochemical prognosticator in severe malaria ?

Harrison's 18th Ed. 1693

- A. pH
- B. Bicarbonate concentration
- C. PO_2
- D. PCO_2

690 Which of the following is the best biochemical prognosticator in severe malaria ?

Harrison's 18th Ed. 1693

- A. pH
- B. PCO_2
- C. Lactate concentration

D. Serum Bilirubin

691 In severe malaria, lactic acidosis is caused by ?

Harrison's 18th Ed. 1693

- A. Anaerobic glycolysis in tissues
- B. Lactate production by parasites
- C. Failure of hepatic & renal lactate clearance
- D. All of the above

Plasma concentrations of bicarbonate or lactate are the best biochemical prognosticators in severe malaria. Lactic acidosis is caused by the combination of anaerobic glycolysis in tissues where sequestered parasites interfere with microcirculatory flow, hypovolemia, lactate production by the parasites, and a failure of hepatic and renal lactate clearance.

692 Which of the following statements about renal impairment in severe falciparum malaria is false ?

Harrison's 18th Ed. 1693

- A. More common in adults, rare in children
- B. Manifests as acute tubular necrosis
- C. Renal cortical necrosis never develops
- D. None of the above

693 Which of the following is "uncommon" among children with severe malaria ?

Harrison's 18th Ed. 1695

- A. Convulsions, coma
- B. Hypoglycemia
- C. Acute pulmonary edema
- D. Metabolic acidosis

694 Which of the following is "uncommon" among children with severe malaria ?

Harrison's 18th Ed. 1695

- A. Convulsions, coma
- B. Hypoglycemia
- C. Acute renal failure
- D. Severe anemia

695 Which of the following is "uncommon" among children with severe malaria ?

Harrison's 18th Ed. 1695

- A. Metabolic acidosis
- B. Hypoglycemia
- C. Deep jaundice
- D. Severe anemia

Convulsions, coma, hypoglycemia, metabolic acidosis & severe anemia are relatively common among children with severe malaria, whereas deep jaundice, acute renal failure & acute pulmonary edema are unusual.

696 Which of the following is "uncommon" among pregnant women with severe malaria ?

Harrison's 18th Ed. 1694, Table 210-4

- A. Renal failure
- B. Hypoglycemia
- C. Convulsions
- D. Pulmonary edema

Congenital malaria occurs in <5% of newborns whose mothers are infected.

697 Severe anaemia in malaria is due to ?*Lancet 2005; 365: 1487-98, Harrison's 18th Ed. 1693*

- A. Direct destruction of parasitised RBC's
- B. Destruction of non-parasitised RBC's
- C. Bone-marrow suppression
- D. All of the above

*Anemia results from accelerated RBC removal by the spleen, obligatory RBC destruction at parasite schizogony, and ineffective erythropoiesis.***698 Severe jaundice in P. falciparum infections is due to ?***Harrison's 18th Ed. 1694*

- A. Hemolysis
- B. Hepatocyte injury
- C. Cholestasis
- D. All of the above

*Severe jaundice in P. falciparum infections results from hemolysis, hepatocyte injury & cholestasis.***699 Malaria can be transmitted by ?***Harrison's 18th Ed. 1695*

- A. Blood transfusion
- B. Organ transplantation
- C. Sharing of needles by infected drug addicts
- D. All of the above

*Malaria can be transmitted by blood transfusion, needle-stick injury, sharing of needles by infected injection drug users, or organ transplantation.***700 Tropical Splenomegaly is also called ?***Harrison's 18th Ed. 1695*

- A. Hyperactive malarial splenomegaly
- B. Hypertrophic malarial splenomegaly
- C. Hyperreactive malarial splenomegaly
- D. Hypercongestive malarial splenomegaly

*Tropical splenomegaly is also called Hyperreactive malarial splenomegaly (HMS).***701 Which of the following can cause nephrotic syndrome ?***Harrison's 18th Ed. 1695*

- A. P. vivax
- B. P. ovale
- C. P. malariae
- D. P. falciparum

702 Quartan malarial nephropathy usually responds poorly to treatment with ?*Harrison's 18th Ed. 1695*

- A. Antimalarial agents
- B. Glucocorticoids
- C. Cytotoxic drugs
- D. All of the above

*Quartan nephropathy usually responds poorly to treatment with either antimalarial agents or glucocorticoids and cytotoxic drugs.***703 Which of the following about blood smear prepared for visualising malarial parasite is false ?***Harrison's 18th Ed. 1695*

- A. Thin blood smear should be fixed in anhydrous methanol

- B. RBC's in tail of thin blood smear should be examined
- C. Thick blood film should be of even thickness
- D. Thick smear should be stained without fixing

*Both thin and thick blood smears should be examined. Thin blood smear should be rapidly air-dried, fixed in anhydrous methanol, and stained. RBCs in tail of the film should then be examined. Level of parasitemia is expressed as number of parasitized RBC's per 1000 RBCs. Thick blood film should be of uneven thickness, dried thoroughly and stained without fixing.***704 Patients with what count of parasite are at increased risk of dying ?***Harrison's 18th Ed. 1696*

- A. $> 10^2$ parasites/ μ L
- B. $> 10^3$ parasites/ μ L
- C. $> 10^4$ parasites/ μ L
- D. $> 10^5$ parasites/ μ L

*Patients with $> 10^5$ parasites/ μ L are at increased risk of dying, though nonimmune patients may die with lower counts, and partially immune persons may tolerate parasitemia levels many times higher with only minor symptoms.***705 In severe malaria, a poor prognosis is indicated by ?***Harrison's 18th Ed. 1696*

- A. > 20 % of parasites with visible pigment in PBF
- B. Presence of circulating schizonts in PBF
- C. Phagocytosed malarial pigment in $>5\%$ of neutrophils
- D. All of the above

*In severe malaria, a poor prognosis is indicated by a predominance of more mature P. falciparum parasites ($>20\%$ parasites with visible pigment) in PBF or by presence of phagocytosed malarial pigment in $>5\%$ of neutrophils and peripheral schizontaemia.***706 In P. falciparum infections, gametocytemia peaks how many weeks after the peak of asexual parasites ?***Harrison's 18th Ed. 1696*

- A. 1
- B. 2
- C. 3
- D. 4

*In P. falciparum infections, gametocytemia peaks 1 week after the peak of asexual parasites.***707 At low levels of parasitemia, staining of malaria parasite with which of the following stains allows more rapid diagnosis ?***Harrison's 18th Ed. 1696*

- A. Giemsa's
- B. Wright's
- C. Leishman's
- D. Fluorescent dye acridine orange

*Of the Romanowsky stains, Giemsa at pH 7.2 is preferred. Wright's, Field's, or Leishman's stain can also be used. Staining of parasites with fluorescent dye acridine orange allows more rapid diagnosis of malaria in patients with low-level parasitemia.***708 Specific antibody-based diagnostic stick or card test for malaria detect which P. falciparum specific antigen ?***Harrison's 18th Ed. 1696*

- A. PfHRP1
- B. PfHRP2
- C. PfHRP3
- D. PfHRP4

Rapid, simple, sensitive & specific antibody-based diagnostic stick or card tests detect P. falciparum

specific, histidine-rich protein 2 (PfHRP2) or lactate dehydrogenase antigens in blood samples. PfHRP2-based tests may remain positive for several weeks after acute infection.

709 Which laboratory finding is not found in malaria ?

Harrison's 18th Ed. 1697

- A. Normochromic, normocytic anemia
- B. Elevated C-reactive protein
- C. Reduced platelet count
- D. Elevated levels of antithrombin III

Laboratory findings in malaria include normochromic, normocytic anemia, normal TLC, raised ESR, raised plasma viscosity, raised CRP, reduced platelet count, reduced antithrombin III even in mild infection.

710 Trophozoites and schizonts of Plasmodium knowlesi is morphologically similar to which of the following ?

Lancet 2005; 365: 1487-98

- A. P. falciparum
- B. P. vivax
- C. P. malariae
- D. P. ovale

711 Which of the following is a blood-stage schizonticide ?

N Engl J Med 2008;359:603-12

- A. Atovaquone - proguanil
- B. Doxycycline
- C. Mefloquine
- D. All of the above

Blood-stage schizonticides are Atovaquone-proguanil, Doxycycline, Mefloquine and Chloroquine. They interrupt schizogony within red cells, preventing clinical manifestations of malaria infection.

712 Which of the following statements is false ?

N Engl J Med 2008;359:603-12

- A. Atovaquone-proguanil acts on liver schizonts of all four Plasmodial species
- B. Primaquine kills quiescent hypnozoites
- C. Atovaquone-proguanil does not act on hypnozoites
- D. None of the above

Schizonts are multinucleated stages of parasites that undergo mitotic division within host cells. Hepatic stage schizonticides - atovaquone-proguanil & primaquine kill malaria parasites within hepatocytes and act on liver schizonts of all four species of plasmodia. Primaquine kills quiescent hypnozoites while Atovaquone-proguanil does not act on hypnozoites.

713 RTS,S/AS02A is an experimental vaccine against ?

Lancet 2005; 365: 1487-98

- A. Hepatitis A
- B. Hepatitis C
- C. Malaria
- D. Leishmania

714 Quinine kills the gametocytes of all except ?

Harrison's 18th Ed. 1700 Table 210-7

- A. P. vivax
- B. P. ovale
- C. P. malariae
- D. P. falciparum

715 In China, artemisinin is also called ?

- A. Qingli

- B. Qinghaosu
- C. Qingchao
- D. Qingshi

In China, artemisinin is also called qinghaosu.

716 Chinese government scientists worked on which secret project that developed artemisinins or qinghaosu derivatives ?

N Engl Med 2011;365:1073

- A. Project 521
- B. Project 522
- C. Project 523
- D. Project 524

Chinese government scientists worked on secret "Project 523" that developed artemisinins or qinghaosu derivatives.

717 Researchers in China isolated the active artemisinin compounds from the plant named ?

N Engl Med 2011;365:1073

- A. Artemisia genia
- B. Artemisia annua
- C. Artemisia gripe
- D. Artemisia duova

718 Active metabolite of artesunate and artemether is ?

Harrison's 18th Ed. 1700 Table 210-7

- A. Monohydroartemisinin
- B. Dihydroartemisinin
- C. Trihydroartemisinin
- D. Tetrahydroartemisinin

The main active metabolite of artesunate is dihydroartemisinin. Artemether is oil-based whereas artesunate is water soluble.

719 Active metabolite of 'Proguanil' is ?

Harrison's 18th Ed. 1700 Table 210-7

- A. Guanil
- B. Cycloguanil
- C. Pentaguanil
- D. Guanylddehyde

720 Which antimalarial drug has good absorption ?

Harrison's 18th Ed. 1700 Table 210-7

- A. Halofantrine
- B. Lumefantrine
- C. Atovaquone
- D. Artesunate

721 Which antimalarial drug kills all stages of gametocyte development of P. falciparum ?

Harrison's 18th Ed. 1700 Table 210-7

- A. Halofantrine
- B. Quinine
- C. Primaquine
- D. Artesunate

722 Halofantrine should not be used with which of the following antimalarial drug ?

Harrison's 18th Ed. 1700 Table 210-7

- A. Chloroquine
- B. Quinine
- C. Mefloquine
- D. All of the above

723 Halofantrine is not be used with which of the following drug ?

Harrison's 18th Ed. 1700 Table 210-7

- A. Tricyclic antidepressants
- B. Terfenadine
- C. Astemizole
- D. All of the above

^bHalofantrine should not be used by patients with long ECG QT^c intervals or known conduction disturbances or by those taking drugs that may affect ventricular repolarization like quinidine, quinine, mefloquine, chloroquine, neuroleptics, antiarrhythmics, tricyclic antidepressants, terfenadine, or astemizole.

724 Chloroquine can cause retinopathy when its cumulative dose exceeds ?

Harrison's 18th Ed. 1700 Table 210-7

- A. > 10 gram
- B. > 50 gram
- C. > 75 gram
- D. > 100 gram

725 In quartan malaria, regular fever patterns are evident every ?

Harrison's 18th Ed. 1691

- A. 2 days
- B. 3 days
- C. 4 days
- D. 5 days

726 In malaria, Quinine causes hypoglycemia due to ?

Harrison's 18th Ed. 1693

- A. Failure of hepatic gluconeogenesis
- B. Stimulation of pancreatic insulin secretion
- C. Decreased glucagon secretion
- D. All of the above

727 Optimal therapeutic range for quinine in severe malaria is ?

Harrison's 18th Ed. 1701

- A. 0.6 to 1.2 mg/mL
- B. 2 to 4 mg/mL
- C. 8 to 15 mg/mL
- D. 25 to 35 mg/mL

For quinine, total plasma concentrations of 8 - 15 mg/L provides optimal therapeutic range for its effect in severe malaria and does not cause serious toxicity.

728 Main quinine binding plasma protein is ?

British Medical Bulletin 2005; 75 & 76: 29-47

- A. α 1-Acid Glycoprotein (α 1-AGP)
- B. β 1-Acid Glycoprotein (β 1-AGP)
- C. δ 1-Acid Glycoprotein (δ 1-AGP)
- D. γ 1-Acid Glycoprotein (γ 1-AGP)

α 1-Acid Glycoprotein (α 1-AGP or Orosomucoid) is the main quinine binding plasma protein.

729 Which of the following tests have no role in the diagnosis of malaria ?

Harrison's 18th Ed. 1698 Table 210-5

- A. Plasmodium LDH test
- B. PfHRP2
- C. Acridine orange staining
- D. Polymerase chain reaction

Antibody & polymerase chain reaction tests have no role in diagnosis of malaria. However, PCR is used for genotyping and speciation in mixed infections.

730 What level of parasitemia is associated with an increased risk of severe malaria ?

Harrison's 18th Ed. 1698 Table 210-5

- A. > 20000 parasites/ μ L
- B. > 40000 parasites/ μ L
- C. > 80000 parasites/ μ L
- D. > 100000 parasites/ μ L

Indicators of severe malaria are Glasgow coma scale <11/15 in adults, or Blantyre coma scale <3/5 in children, shock (SBP<70 mmHg or core-skin temperature difference >10°C), blood bicarbonate <15 mmol/L, haematocrit <20% and Pf parasitaemia >100000/ μ L, visible jaundice and Pf parasitaemia >100000/ μ L, blood urea nitrogen >17 mmol/L, asexual Pf parasitaemia >10%, plasma glucose <2.2 mmol/L, respiratory distress (>32 breaths per minute)

731 Which of the following test indicates that the illness is falciparum malaria, even if the blood smear is negative ?

Harrison's 18th Ed. 1698 Table 210-5

- A. Positive PfHRP1 test
- B. Positive PfHRP2 test
- C. Positive PfHRP3 test
- D. Positive PfHRP4 test

732 Parasite count/ μ L can be calculated by ?

Harrison's 18th Ed. 1698 Table 210-5

- A. Parasitized RBCs (%) x Hemoglobin x 1256
- B. Parasitized RBCs (%) x Hematocrit x 1256
- C. Parasitized RBCs (%) x Reticulocyte count x 1256
- D. Parasitized RBCs (%) x Platelet count x 1256

733 Parasite count/ μ L can be calculated by ?

Harrison's 18th Ed. 1698 Table 210-5

- A. Asexual parasites/200 WBCs x 10
- B. Asexual parasites/200 WBCs x 20
- C. Asexual parasites/200 WBCs x 30
- D. Asexual parasites/200 WBCs x 40

734 Exchange transfusion for severe malaria is indicated for parasitemia levels of ?

Harrison's 16th Ed. 1227

- A. > 2 %
- B. > 5 %
- C. > 10 %
- D. > 15 %

Erythrocytapheresis in which the RBC fraction is removed by apheresis & plasma, leukocyte & platelet fractions are returned to patient is also used with good effect in severe disease.

735 Which of the following antimalarials is safe in pregnancy ?

Harrison's 18th Ed. 1702

- A. Chloroquine

- B. Primaquine
- C. Doxycycline
- D. Atovaquone-proguanil

736 If the first PBF is negative & malaria is strongly suspected, repeat blood smears should be performed at least every ?

Harrison's 18th Ed. 1698

- A. 3 - 6 hours for 1 day
- B. 12 - 24 hours for 1 days
- C. 12 - 24 hours for 2 days
- D. 12 - 24 hours for 3 days

Repeat blood smears should be performed at least every 12-24 hours for 2 days if the first smears are negative and malaria is strongly suspected.

737 Treatment of choice for the "benign" human malarias in southern Asia is ?

Harrison's 18th Ed. 1698

- A. Chloroquine
- B. Quinine
- C. Artesunate
- D. Mefloquine

Despite chloroquine resistance, chloroquine remains the treatment of choice for "benign" human malarias (P. vivax, P. ovale, P. malariae) except in Indonesia and Papua New Guinea.

738 Which of the following about blackwater fever is false ?

British Medical Bulletin 2005; 75 & 76: 29-47

- A. Massive intravascular haemolysis & haemoglobinuria
- B. Quinine administration
- C. Glucose-6-phosphate dehydrogenase (G6PD) deficiency
- D. None of the above

Blackwater fever reflects the presence of massive haemolysis leading to haemoglobinuria especially after quinine or artemisinin derivatives administration. Mechanism remains unknown. In some it may be associated with an underlying haemolytic tendency, e.g. G6PD deficiency.

739 In endemic areas, WHO recommends which of the following as first-line treatment for uncomplicated falciparum malaria everywhere ?

Harrison's 18th Ed. 1701

- A. Artemisinin
- B. Artemisinin-based combinations
- C. Chloroquine
- D. Mefloquine

In endemic areas, WHO recommends Artemisinin-based combinations as first-line treatment for uncomplicated falciparum malaria everywhere.

740 Which of the following is a water-soluble antimalarial ?

Harrison's 18th Ed. 1701

- A. Artemether
- B. Artemotil (arteether)
- C. Artesunate
- D. All of the above

Parenteral artesunate is a water-soluble artemisinin derivative and is the drug of choice in treating severe malaria. Artemether and artemotil (arteether) are oil-based formulations.

741 Indication for slowing infusion rates of quinidine is ?

Harrison's 18th Ed. 1701

- A. Total plasma levels >8 µg/mL

- B. QT_c interval >0.6 seconds
- C. QRS widening beyond 25% of baseline
- D. All of the above

742 What is the total plasma concentrations of quinine at which it is effective & does not cause serious toxicity ?

Harrison's 18th Ed. 1701

- A. 1 - 6 mg/L
- B. 8 - 15 mg/L
- C. 18 - 31 mg/L
- D. 36 - 55 mg/L

Total plasma concentrations of 8 - 15 mg/L for quinine is effective & does not cause serious toxicity.

743 In renal failure, the initial dose of quinine should be reduced by ?

Harrison's 18th Ed. 1701

- A. Nil
- B. 10 %
- C. 25 %
- D. 50 %

If patient remains seriously ill or is in acute renal failure for >2 days, maintenance doses of quinine should be reduced by 30-50%. The initial doses should never be reduced.

744 For recrudescence of malaria following first-line therapy, second-line treatment is given for what duration ?

Harrison's 18th Ed. 1702

- A. 3 days
- B. 5 days
- C. 7 days
- D. 10 days

As second-line treatment for recrudescence following first-line therapy, a 7-day course of either artesunate or quinine plus tetracycline, doxycycline, or clindamycin is effective.

745 Which of the following statements about falciparum malaria in endemic areas is false ?

Harrison's 18th Ed. 1702

- A. Should not be treated with single drug
- B. Should be treated with drug combinations
- C. Combination drugs should have different modes of action
- D. None of the above

To prevent resistance, PF malaria should be treated with drug combinations and not with single drugs in endemic areas. Combination drugs (two or more) must be used simultaneously and must have different modes of action.

746 Cinchonism comprises of all of the following except ?

Harrison's 18th Ed. 1702

- A. Tinnitus
- B. Dysphoria
- C. High-tone deafness
- D. Diarrhoea

Cinchonism comprising tinnitus, high-tone deafness, nausea, vomiting, and dysphoria.

747 In drug resistance areas, quinine can be given with all of the following except ?

Harrison's 18th Ed. 1702

- A. Tetracycline

- B. Doxycycline
- C. Clarithromycin
- D. Clindamycin

As second-line treatment for recrudescence following first-line therapy, a 7-day course of either artesunate or quinine plus tetracycline, doxycycline, or clindamycin is effective.

748 Artemisinin derivative in combination regimens can be combined with which of the following ?

Harrison's 18th Ed. 1702, Lancet 2005; 365: 1487-98

- A. Lumefantrine
- B. Mefloquine
- C. Sulfadoxine / pyrimethamine
- D. All of the above

Artemisinin combination regimens now constitute first-line treatment for Pf malaria. In multidrug-resistant Pf malaria, artemether-lumefantrine or artesunate-mefloquine should be used. In drug-sensitive areas, atovaquone-proguanil, mefloquine, artesunate-amodiaquine or artesunate-sulfadoxine/pyrimethamine can be used. Other combinations are Dihydroartemisinin-piperaquine, Dihydroartemisinin-naphthoquine-trimethoprim.

749 If a malaria patient vomits within one hour of administration of any oral antimalarial drug, what should be done ?

Harrison's 18th Ed. 1702

- A. Repeat the same dose
- B. Reduce the dose
- C. Give parenteral preparation
- D. Change to another oral preparation

If a malaria patient vomits within one hour of administration of any oral antimalarial drug, the dose should be repeated.

750 Which of the following antimalarial drugs exacerbate the orthostatic hypotension associated with malaria ?

Harrison's 18th Ed. 1702

- A. Chloroquine
- B. Mefloquine
- C. Quinine
- D. All of the above

All the antimalarial quinolines like chloroquine, mefloquine, and quinine exacerbate the orthostatic hypotension associated with malaria.

751 Antimalarial drug resistance is likely if parasitemia?

Harrison's 18th Ed. 1702

- A. Does not fall < 25 % of admission value in 6 hours
- B. Does not fall < 25 % of admission value in 12 hours
- C. Does not fall < 25 % of admission value in 24 hours
- D. Does not fall < 25 % of admission value in 48 hours

752 Antimalarial drug resistance is likely if ?

Harrison's 18th Ed. 1702

- A. Parasitemia has not cleared by 2 days
- B. Parasitemia has not cleared by 5 days
- C. Parasitemia has not cleared by 7 days
- D. Parasitemia has not cleared by 10 days

If the level of parasitemia does not fall to <25% of admission value in 48 hours or if parasitemia has not cleared by 7 days, drug resistance is likely.

753 Primaquine is given for how many days to eradicate persistent liver stages & to prevent relapse ?

Harrison's 18th Ed. 1702

- A. 5 days
- B. 10 days
- C. 14 days
- D. 21 days

To eradicate persistent liver stages & prevent relapse (radical treatment), primaquine should be given daily for 14 days after ruling out G6PD deficiency.

754 Peak feeding time for mosquitoes is ?

Harrison's 18th Ed. 1703

- A. Dusk
- B. Dawn
- C. Throughout the night
- D. All of the above

Prevention of malaria includes avoidance of exposure to mosquitoes at their peak feeding times - dusk, dawn and throughout the night.

755 Which of the following drugs is used for prophylaxis against malaria in travellers ?

Harrison's 18th Ed. 1703

- A. Mefloquine
- B. Pyrimethamine
- C. Quinine
- D. Artesunate

756 Which of the following drugs is used for prophylaxis against malaria in travellers ?

Harrison's 18th Ed. 1703

- A. Doxycycline
- B. Pyrimethamine
- C. Quinine
- D. Artesunate

Recommendations for prophylaxis include drugs effective against resistant P. falciparum like atovaquone-proguanil, doxycycline, mefloquine, or primaquine.

757 Which antimalarial drug is used for chemoprophylaxis for pregnant women ?

Harrison's 18th Ed. 1703

- A. Mefloquine
- B. Artesunate
- C. Primaquine
- D. Doxycycline

Mefloquine is the only drug advised for pregnant women traveling to areas with drug-resistant malaria. Doxycycline & primaquine should not be given to pregnant women.

758 Malarial chemoprophylaxis should be continued for what duration after leaving the endemic area ?

Harrison's 18th Ed. 1703

- A. 1 week
- B. 2 week
- C. 3 week
- D. 4 week

- 759 Which malarial chemoprophylactic agent can be discontinued after 1 week of leaving the endemic area ?
Harrison's 18th Ed. 1703
- A. Doxycycline
 - B. Mefloquine
 - C. Atovaquone-proguanil
 - D. None of the above

Antimalarial prophylaxis should continue for 4 weeks after the traveler has left endemic area, except if atovaquone-proguanil or primaquine is taken. These have significant activities against liver stage of infection (causal prophylaxis) & can be discontinued 1 week after departure from endemic area.

- 760 Malarial chemoprophylaxis should be started for what duration before arriving in the endemic area ?
Harrison's 18th Ed. 1703
- A. 1 week
 - B. 2 week
 - C. 3 week
 - D. 4 week

Travelers should start taking antimalarial drugs 2 days to 1-2 weeks before departure so that any untoward reactions can be detected and so that therapeutic antimalarial blood concentrations will be present when needed.

- 761 Chemoprophylaxis with which of the following antimalarial drugs can be given to pregnant women at risk in endemic areas ?
Harrison's 18th Ed. 1703
- A. Chloroquine
 - B. Proguanil
 - C. Intermittent treatment with pyrimethamine-sulfadoxine
 - D. All of the above

- 762 Which of the following antimalarial drug is associated with a high risk of agranulocytosis ?
Harrison's 18th Ed. 1705
- A. Proguanil
 - B. Amodiaquine
 - C. Atovaquone
 - D. Mefloquine

When used continuously, amodiaquine is associated with a high risk of agranulocytosis and hepatotoxicity and should not be used for prophylaxis.

- 763 Which of the following antimalarial drug has “sporonticidal activity” ?
Harrison's 18th Ed. 1705
- A. Proguanil
 - B. Amodiaquine
 - C. Atovaquone
 - D. Mefloquine

Dihydrofolate reductase inhibitor proguanil inhibit development in mosquito (sporontocidal activity).

- 764 Insecticide DDT refers to ?
- A. Dichlorodiphenyltrichloroethane
 - B. Dichlorodipropyltrichloroethane
 - C. Dichlorodiphenyltrichloroethylene
 - D. Dichlorodipropyltrichloroethylene

Insecticide DDT refers to Dichlorodiphenyltrichloroethane.

- 765 Which of the following programmes is related to the control of malaria ?
- A. MACEPA
 - B. PATH
 - C. MMV
 - D. All of the above

Malaria Control and Evaluation Partnership in Africa (MACEPA), Program for Appropriate Technology in Health (PATH) and Medicines for Malaria Venture (MMV) are programmes for the control of malaria.

Dengue fever

- 766 Which of the following statements about Dengue fever is false ?
N Engl J Med 2012;366:1423-32
- A. Self-limited illness
 - B. Systemic viral infection
 - C. Transmitted to humans by mosquitoes
 - D. None of the above

Dengue is a self-limited, systemic viral infection transmitted to humans by mosquitoes.

- 767 Globally, about how many countries are affected by dengue ?
N Engl J Med 2012;366:1423-32
- A. 50
 - B. 100
 - C. 150
 - D. 200

An estimated 50 million infections per year occur across ~100 countries.

- 768 Dengue is said to have emerged from ?
N Engl J Med 2012;366:1423-32
- A. Africa
 - B. Latin America
 - C. South East Asia
 - D. Australia

Dengue emerged from Africa during slave trade in 15th to 19th centuries, spread into Asia through commercial exchanges in 18th & 19th centuries. It spread globally with the advent of increased travel & trade in the past 50 years.

- 769 Which of the following is related to Dengue ?
N Engl J Med 2012;366:1423-32, Harrison's 18th Ed. 1622
- A. Aedes albopictus
 - B. Aedes triseriatus
 - C. Culex tritaeniorhynchus
 - D. Culex tarsalis

In recent years, a secondary vector, Aedes albopictus, has dramatically expanded Dengue spread from Asia to United States, Indian Ocean, and parts of Europe.

- 770 Which of the following is best related to dengue spread ?
N Engl J Med 2012;366:1423-32, Harrison's 18th Ed. 1622
- A. Urban migration
 - B. Textile trade
 - C. Trade of tires from used vehicles
 - D. Global warming

Globalization of trade, particularly trade of tires from used vehicles, explains the dispersal of eggs & immature forms of these arboviral vectors into new territories.

771 Aedes aegypti is an efficient vector of ?

Harrison's 18th Ed. 1622

- A. Yellow fever
- B. Chikungunya virus
- C. Dengue virus
- D. All of the above

772 Which of the following is a Flavivirus ?

Harrison's 18th Ed. 1622 Table 196-1

- A. Yellow fever
- B. Japanese encephalitis
- C. Dengue
- D. All of the above

773 Which of the following about A. aegypti is false ?

Harrison's 18th Ed. 1622

- A. Typically breeds near human habitation
- B. Breeds using relatively fresh water
- C. Bites during the day
- D. None of the above

Aedes aegypti mosquitotypically breeds near human habitation, using relatively fresh water, and bites during the day.

774 Incubation period of Dengue fever is ?

Harrison's 18th Ed. 1622

- A. 1 to 2 days
- B. 2 to 7 days
- C. 10 to 14 days
- D. 14 to 21 days

Incubation period of Dengue fever is 2 - 7 days.

775 "Break-bone fever" is suggestive of ?

Harrison's 18th Ed. 1622

- A. Lyme disease
- B. Relapsing fever
- C. Typhoid fever
- D. Dengue fever

Severe myalgia seen in Dengue fever is named "break-bone fever". Other presentations are sudden onset of fever, headache, retroorbital & back pain.

776 Biphasic "saddleback" fever is suggestive of ?

Harrison's 18th Ed. 150 Table 17-1

- A. Lyme disease
- B. Relapsing fever
- C. Typhoid fever
- D. Dengue fever

777 Which of the following is central to pathogenesis of dengue fever and DHF/DSS ?

Harrison's 18th Ed. 1632

- A. Protective antiviral antibodies
- B. Macrophage/monocyte infection
- C. T cell non-reactivity
- D. All of the above

Cross-reactive but non-neutralizing anti-dengue antibodies from previous infection bind to new infecting serotype & enhance viral uptake of monocytes and macrophages. This antibody-dependent enhancement results in an amplified cascade of cytokines & complement activation, causing endothelial dysfunction, platelet destruction & consumption of coagulation factors leading to plasma leakage and hemorrhagic manifestations.

778 Which of the following is best related to dengue ?

N Engl J Med 2012;366:1423-32

- A. Heparan sulfate
- B. Keratan sulfate
- C. Ceramide
- D. Sphingomyelin

Preliminary data suggest that in dengue fever, transient disruption in the function of endothelial glycocalyx layer occurs bringing about crucial change in the filtration characteristics of the glycocalyx. Both the virus itself and dengue NS1 are known to adhere to heparan sulfate, a key structural element of the glycocalyx, and increased urinary heparan sulfate excretion has been detected in children with severe infection.

779 Which of the following condition is required to label a case of dengue as severe dengue ?

N Engl J Med 2012;366:1423-32

- A. Plasma leakage resulting in shock
- B. Severe bleeding
- C. Severe organ impairment
- D. All of the above

Severe dengue refers to plasma leakage resulting in shock, accumulation of serosal fluid sufficient to cause respiratory distress, or both; severe bleeding; and severe organ impairment.

780 Which of the following is false about dengue fever ?

Harrison's 18th Ed. 1632

- A. Zoonotic illness
- B. Urban vector
- C. Most common arboviral disease worldwide
- D. None of the above

Viral hemorrhagic fevers are zoonotic illnesses caused by viruses that reside in arthropod urban vectors. Dengue is the most common arboviral disease worldwide. Patients have a triad of symptoms - hemorrhagic manifestations, evidence of plasma leakage, and platelet counts <100,000/ μ L.

781 Which infecting serotype of dengue virus is most dangerous ?

Harrison's 18th Ed. 1632

- A. Type 1
- B. Type 2
- C. Type 3
- D. Type 4

Type 2 (especially Southeast Asian) is more dangerous than other dengue serotypes with more potential to cause DHF/DSS. Serotype 1 followed by serotype 2 is more dangerous than serotype 4 followed by serotype 2.

782 Which of the following is not a phase of dengue fever ?

N Engl J Med 2012;366:1423-32

- A. Initial afebrile phase
- B. Initial febrile phase
- C. Critical phase around defervescence
- D. Spontaneous recovery phase

Three phases of dengue fever are an initial febrile phase, a critical phase around the time of defervescence, and a spontaneous recovery phase. Systemic vascular leak syndrome becomes apparent around the time of defervescence (days 4 and 7 of the illness), evidenced by increasing hemoconcentration, hypoproteinemia, pleural effusions, and ascites.

783 Warning signs that clinically significant vascular leakage may be developing in dengue patient include ?

N Engl J Med 2012;366:1423-32

- A. Persistent vomiting
- B. High or increasing hematocrit level
- C. Pulse pressure of 20 mm Hg or less
- D. All of the above

Warning signs that clinically significant vascular leakage may be developing in dengue patient include persistent vomiting, increasingly severe abdominal pain, tender hepatomegaly, a high or increasing hematocrit level that is concurrent with a rapid decrease in the platelet count, serosal effusions, mucosal bleeding, and lethargy or restlessness. If the pulse pressure narrows to 20 mm Hg or less, accompanied by signs of peripheral vascular collapse, dengue shock syndrome is diagnosed. Moderate to severe thrombocytopenia is common, with nadir platelet counts below 20000 per microliter often observed during the critical phase, followed by rapid improvement during the recovery phase.

784 Which of the following about DHF/DSS is false ?

Harrison's 18th Ed. 1632

- A. Susceptibility drops after 12 years of age
- B. Females are more often affected than males
- C. Malnutrition is protective
- D. None of the above

Susceptibility to DHF/DSS drops after 12 years of age, females are more often affected than males, malnutrition is protective.

785 Dengue hemorrhagic fever causes which of the following ?

Harrison's 18th Ed. 2353

- A. MPGN
- B. Focal glomerulonephritis
- C. Endocapillary proliferative glomerulonephritis
- D. Diffuse proliferative nephritis

Viral infections and their respective glomerular lesions include: CMV - MPGN; measles - endocapillary proliferative glomerulonephritis, parvovirus - mesangioproliferative glomerulonephritis, mumps - mesangioproliferative glomerulonephritis, Epstein-Barr virus - MPGN, dengue hemorrhagic fever - endocapillary proliferative glomerulonephritis, and coxsackie virus - focal glomerulonephritis.

786 After an infected mosquito bites person, the dengue virus replicates in ?

N Engl J Med 2005;353:924-32

- A. Regional lymph nodes
- B. Bone marrow
- C. Spleen
- D. Liver

After an infected mosquito bites a person, virus replicates in regional lymph nodes and is disseminated through lymphatic system & blood to other tissues.

787 A person may be infected with dengue virus for a maximum of ?

N Engl J Med 2005;353:924-32

- A. Once
- B. Twice
- C. Thrice
- D. Four times

Infection with one Dengue serotype confers long-term immunity only to that serotype and therefore persons may be infected up to four times.

788 Which of the following is a risk factor for severe dengue ?

N Engl J Med 2012;366:1423-32

- A. Young age

- B. Female sex
- C. High body-mass index
- D. All of the above

Epidemiologic studies have identified young age, female sex, high body-mass index, virus strain, and genetic variants of the human major-histocompatibility-complex class I-related sequence B and phospholipase C epsilon 1 genes as risk factors for severe dengue. Secondary infection, i.e. two sequential infections by different serotypes, is also an epidemiologic risk factor for severe disease.

789 Main risk factor for development of DHF / DSS is ?

N Engl J Med 2005;353:924-32

- A. Strain and serotype of the infecting virus
- B. Secondary infection with another serotype
- C. Age and genetic background of patient
- D. Degree of viremia

Main risk factor for development of dengue hemorrhagic fever & dengue shock syndrome is secondary infection with another serotype.

790 Petechiae DHF/DSS are best visualized in ?

Harrison's 18th Ed. 1628

- A. Groin
- B. Palm
- C. Axillae
- D. Nape of the neck

Petechiae DHF/DSS are best visualized in axillae.

791 In dengue fever, skin rash occurs in what proportion of cases ?

Harrison's 18th Ed. 150 Table 17-1

- A. 25 %
- B. 50 %
- C. 75 %
- D. 100 %

792 In dengue fever, the kind of skin rash is ?

Harrison's 18th Ed. 150 Table 17-1, N Engl J Med 2012;366:1423-32

- A. Macular
- B. Papular
- C. Maculopapular
- D. Pustular

793 In dengue fever, the skin rash begins on ?

Harrison's 18th Ed. 150 Table 17-1

- A. Face
- B. Extremities
- C. Trunk
- D. Neck

In dengue fever, skin rash occurs in 50% of cases. To start with its a diffuse flushing, midway through illness, it is maculopapular rash, beginning on trunk & spreads centrifugally to extremities and face, after defervescence, petechiae on extremities may occur. A second rash may appear during recovery phase, ranging from mild maculopapular rash to severe, itchy lesion suggesting leukocytoclastic vasculitis that resolves with desquamation over a period of 1 to 2 weeks.

794 Purpuric eruptions may occur in which of the following illnesses ?

Harrison's 18th Ed. 150 Table 17-1

- A. Rocky Mountain spotted fever
- B. Endocarditis

- C. Dengue fever
- D. All of the above

Purpuric eruptions may occur in Rocky Mountain spotted fever, rat-bite fever, endocarditis, epidemic typhus, dengue fever, human parvovirus B19 infection, acute & chronic meningococemia, purpura fulminans, disseminated gonococcal infection, enteroviral petechial rash, viral hemorrhagic fever, thrombotic thrombocytopenic purpura/hemolytic-uremic syndrome, and cutaneous small-vessel vasculitis (leukocytoclastic vasculitis).

795 Over the past decade, incidence of dengue has increased particularly in which region ?

Harrison's 18th Ed. 1044

- A. Caribbean
- B. Latin America
- C. Southeast Asia
- D. All of the above

Over the past decade, incidence of dengue has increased particularly in Caribbean, Latin America, and Southeast Asia.

796 In febrile returned travelers, dengue was acquired most often from ?

Harrison's 18th Ed. 1048 Table 123-3

- A. Southern Asia
- B. Southeast Asia
- C. Latin America
- D. Africa

Cooperative study by GeoSentinel of febrile returned travelers, it was found that malaria was acquired most often from Africa, dengue from Southeast Asia and Caribbean, typhoid fever from southern Asia, and rickettsial infections (tick typhus) from southern Africa.

797 Viral hemorrhagic fevers are caused by which group of viruses ?

Harrison's 18th Ed. 1028

- A. Arenaviridae
- B. Bunyaviridae
- C. Flaviviridae
- D. All of the above

Viral hemorrhagic fevers are caused by four major groups of viruses. Arenaviridae (Lassa fever in Africa), Bunyaviridae (Rift Valley fever in Africa or hantavirus hemorrhagic fever with renal syndrome in Asia), Filoviridae (Ebola and Marburg virus infections in Africa), and Flaviviridae (yellow fever in Africa and South America and dengue in Asia, Africa, and the Americas).

798 Which of the following virus infection is also transmitted from person to person ?

Harrison's 18th Ed. 1028

- A. Lassa fever
- B. Yellow fever
- C. Hantavirus hemorrhagic fever with renal syndrome
- D. Dengue fever

799 Which of the following virus infection is also transmitted from person to person ?

Harrison's 18th Ed. 1028

- A. Lassa fever
- B. Ebola virus infections
- C. Marburg virus infections
- D. All of the above

Lassa fever and Ebola and Marburg virus infections are also transmitted from person to person.

800 Vectors for most viral fevers are found in rural areas except ?

Harrison's 18th Ed. 1028

- A. Lassa fever
- B. Ebola virus infections
- C. Hantavirus hemorrhagic fever with renal syndrome
- D. Dengue fever

Vectors for most viral fevers are found in rural areas, dengue & yellow fever are exceptions.

801 In dengue hemorrhagic fever, mortality rates are ?

Harrison's 18th Ed. 1028

- A. 2 - 10 %
- B. 10 - 20 %
- C. 30 - 40 %
- D. 60 - 70 %

In dengue hemorrhagic fever, mortality rates are 10 - 20%. If dengue shock syndrome develops, mortality can reach 40%.

802 Which of the following can be transmitted by blood transfusion ?

Harrison's 18th Ed. 957

- A. Babesiosis
- B. Chagas disease
- C. Dengue
- D. All of the above

Malaria, babesiosis, Chagas disease, dengue, chikungunya virus, variant Creutzfeldt-Jakob disease, Anaplasma phagocytophilum, and yellow fever vaccine virus can be transmitted by blood transfusion.

803 Severe muscle pain is the hallmark of which of the following infections ?

Harrison's 18th Ed. 1068

- A. Influenza
- B. Cysticercosis
- C. Coxsackievirus B
- D. Dengue

Myalgia occurs with viral infection (influenza, dengue, or coxsackievirus B infection) or parasitic invasion (trichinellosis, cysticercosis, or toxoplasmosis), but severe muscle pain is the hallmark of pleurodynia (coxsackievirus B), trichinellosis, and bacterial infection.

804 Positive tourniquet test for capillary fragility is ?

N Engl J Med 2005;353:924-32

- A. 5 or more petechiae appear in a 1 sq. inch
- B. 10 or more petechiae appear in a 1 sq. inch
- C. 15 or more petechiae appear in a 1 sq. inch
- D. 20 or more petechiae appear in a 1 sq. inch

Positive tourniquet test for capillary fragility is positive if 20 or more petechiae appear in a 1 sq. inch patch on forearm after deflation of BP cuff.

805 Tourniquet test is performed by inflating a blood pressure cuff on the upper arm to ?

N Engl J Med 2005;353:924-32

- A. Above systolic BP for 5 minutes
- B. Below diastolic BP for 5 minutes
- C. Between systolic and diastolic BP for 5 minutes
- D. All of the above

The tourniquet test is performed by inflating a BP cuff on upper arm to a point midway between systolic & diastolic blood pressures for five minutes.

806 Which of the following statements about dengue hemorrhagic fever (DHF) is false ?

N Engl J Med 2005;353:924-32

- A. Capillary leakage, accompanied by hemorrhagic manifestations
- B. Plasma leakage develops about a week later after defervescence
- C. Sudden change from fever to hypothermia may be the first clinical warning sign
- D. Often associated with a marked decrease in platelet count

Plasma leakage develops 4 to 7 days after onset of disease, at about the time of defervescence.

807 For the diagnosis of DHF, which of the following is false ?

N Engl J Med 2005;353:924-32, Harrison's 18th Ed. 1028

- A. Hemorrhagic manifestations
- B. Platelet count of < 100,000 per cubic millimeter
- C. Objective evidence of plasma leakage
- D. Hemorrhagic manifestations without capillary leakage also constitute dengue hemorrhagic fever

Hemorrhagic manifestations without capillary leakage do not constitute dengue hemorrhagic fever.

808 Which of the following statements about dengue shock syndrome (DSS) is false ?

N Engl J Med 2005;353:924-32

- A. Rapid, weak pulse with a narrowing pulse pressure
- B. Profound hypotension
- C. Duration of shock is short & mortality rate is ~40 %
- D. Dengue shock syndrome in travelers is common

Dengue shock syndrome in travelers is uncommon, as is death from dengue.

809 A confirmed diagnosis of dengue fever is established by ?

N Engl J Med 2005;353:924-32

- A. Culture of the virus
- B. Polymerase-chain-reaction (PCR) tests
- C. Serologic assays
- D. All of the above

A confirmed diagnosis is established by culture of the virus, polymerase-chain-reaction (PCR) tests, or serologic assays.

810 Which of the following statements about IgM capture ELISA used for diagnosis of dengue fever is false ?

N Engl J Med 2005;353:924-32

- A. Negative early in the course of disease
- B. Rheumatoid factor may lead to false positive assay
- C. Other flavivirus infections never test positive
- D. IgM antibodies are detectable for 3 to 6 months, whereas IgG antibodies remain detectable for life

The most commonly used test for the diagnosis of dengue is IgM capture ELISA. It is negative early in the course of disease and should be performed 4-5 days after onset of symptoms. Other flavivirus infections & rheumatoid factor may lead to false positive test.

811 Which of the following is false about primary infection of dengue virus ?

N Engl J Med 2005;353:924-32

- A. Increase in dengue-specific IgM and IgG antibodies
- B. IgM antibodies appear 4 to 5 days after onset of fever
- C. IgG antibodies appear 7 to 10 days after onset of fever

- D. None of the above

Primary infections are characterized by an increase in dengue-specific IgM antibodies 4 to 5 days after onset of fever and by an increase in IgG antibodies only after 7 to 10 days. IgM antibodies are detectable for three to six months, whereas IgG antibodies remain detectable for life.

812 Criterion for secondary infection of dengue virus is ?

N Engl J Med 2005;353:924-32

- A. Presence of high titers of IgG early in disease course
- B. Absence of high titers of IgG early in disease course
- C. Presence of high titers of IgM early in disease course
- D. Absence of high titers of IgM early in disease course

Presence of high titers of IgG early in the course of disease indicates secondary infection.

813 Which of the following rules out the diagnosis of dengue ?

N Engl J Med 2005;353:924-32

- A. If symptoms begin > 2 weeks after leaving endemic area
- B. Fever that persists for > 10 days
- C. Leucocytosis
- D. All of the above

Dengue can be ruled out if symptoms begin > 2 weeks after traveler has left endemic area. Fever that persists >10 days usually rules out dengue.

814 Which of the following is a laboratory diagnostic option in a patient with suspected dengue infection ?

N Engl J Med 2012;366:1423-32

- A. Detection of viral nucleic acid
- B. Detection of nonstructural protein 1 (NS1)
- C. IgM seroconversion
- D. All of the above

Detection of viral nucleic acid, virus-expressed soluble nonstructural protein 1 (NS1), or IgM seroconversion is a confirmatory finding in patients in whom dengue is a possible diagnosis.

815 Which of the following therapeutic agents have a role in management of dengue ?

N Engl J Med 2005;353:924-32

- A. Corticosteroids
- B. Carbazochrome
- C. Antiviral agents
- D. None of the above

816 Drugs that have shown some antiviral activity against dengue in vitro is ?

N Engl J Med 2005;353:924-32

- A. Ribavirin
- B. Interferon alfa
- C. 6-azauridine
- D. All of the above

Ribavirin, interferon alfa and 6-azauridine have shown some antiviral activity in vitro.

817 Which of the following antiviral drug has been evaluated in patients with confirmed dengue virus infection ?

N Engl J Med 2012;366:1423-32

- A. Docosanol
- B. Balapiravir
- C. Zanamivir

D. Foscarnet

Recent trials have assessed chloroquine, oral prednisolone, and balapiravir in patients with confirmed dengue virus infection. Further trials of statins and other antiviral drugs are planned. Currently, there is no evidence in favor of the use of any specific therapeutic agent for dengue.

818 Which of the following is best related to *A. aegypti* mosquito control ?

Harrison's 18th Ed. 1620, N Engl J Med 2012;366:1423-32

- A. Ehrlichia
- B. Anaplasma
- C. Wolbachia
- D. Neorickettsia.

For mosquito control, destruction of breeding sites is generally the most economically and environmentally sound approach. Emerging technologies include mosquito genetic transformation and introduction of Wolbachia to limit multiplication rates. The strategy involves embryonic introduction of strains of the obligate intracellular bacterium Wolbachia into *A. aegypti*. Wolbachia-infected *A. aegypti* are partially resistant to dengue virus infection and can invade natural *A. aegypti* populations, suggesting the possibility of induction of widespread biologic resistance to dengue viruses in *A. aegypti* populations.

819 Which of the following statements about management of dengue fever is false ?

N Engl J Med 2005;353:924-32

- A. Aspirin and NSAID's are avoided
- B. Intramuscular injections are avoided
- C. Rise in PCV of 20 % indicates considerable plasma loss
- D. None of the above

Aspirin & NSAID's are best avoided as they can increase bleeding. Intra-muscular injections should not be given as they may cause large hematomas. A rise in the hematocrit of 20% indicates considerable plasma loss.

820 Incubation period of Chikungunya virus is ?

Harrison's 17th Ed. 1234

- A. 1 to 2 days
- B. 2 to 3 days
- C. 3 to 4 days
- D. 4 to 5 days

Chapter 153. Typhoid

821 Which of the following is false about 'Salmonellae' ?

Harrison's 18th Ed. 1274

- A. Gram-negative bacilli
- B. Enterobacteriaceae family
- C. Taxonomic name for organism that causes enteric fever is *Salmonella choleraesuis*
- D. None of the above

Genus of gram-negative bacilli within Enterobacteriaceae family consists of *S. choleraesuis* (six subspecies) and *S. bongori*. According to current *Salmonella* nomenclature system, full taxonomic designation *Salmonella enterica* subspecies *enterica* serotype *Typhimurium* can be shortened to *Salmonella* serotype *Typhimurium* or simply *Salmonella Typhimurium*.

822 Most Salmonella serotypes are named after ?

Harrison's 18th Ed. 1274

- A. The person who identified them
- B. The city where they were identified
- C. The river
- D. The laboratory where they were identified

Most *Salmonella* serotypes are named for the city where they were identified.

823 Which of the following is false about Salmonellae ?

Harrison's 18th Ed. 1274

- A. Gram negative
- B. Non-spore forming
- C. Facultatively anaerobic bacilli
- D. None of the above

Salmonellae are gram negative, non-spore forming, facultatively anaerobic bacilli that measure 2 - 3 by 0.4 - 0.6 μ m.

824 Which of the following is false about Salmonellae ?

Harrison's 18th Ed. 1274

- A. Produce acid on glucose fermentation
- B. Reduce nitrates
- C. Do not produce cytochrome oxidase
- D. None of the above

Salmonellae produce acid on glucose fermentation, reduce nitrates & do not produce cytochrome oxidase.

825 Somatic O antigen of Salmonella is related to ?

Harrison's 18th Ed. 1274

- A. Lipopolysaccharide (LPS) cell-wall components
- B. Surface antigen
- C. Flagellar antigen
- D. All of the above

826 H antigen of Salmonella is related to ?

Harrison's 18th Ed. 1274

- A. Lipopolysaccharide (LPS) cell-wall components
- B. Surface antigen
- C. Flagellar antigen
- D. All of the above

Somatic O antigen is related to lipopolysaccharide (LPS) cell-wall components, while the H antigen relates to flagella of bacteria.

827 Infectious dose of Salmonella varies from ?

Harrison's 18th Ed. 1274

- A. 10^2 to 10^3 colony-forming units
- B. 10^3 to 10^6 colony-forming units
- C. 10^6 to 10^8 colony-forming units
- D. 10^9 to 10^{12} colony-forming units

The infectious dose of *Salmonella* infections is 10^3 - 10^6 colony-forming units.

828 *S. typhi* invades gut mucosa through specialised antigen-sampling cells known as ?

Harrison's 18th Ed. 1274

- A. L-cells
- B. M-cells
- C. N-cells
- D. P-cells

In small intestine, salmonellae penetrate mucous layer of gut & traverse intestinal layer through phagocytic microfold (M) cells within Peyer's patches.

829 Which of the following have an ability to survive inside a macrophage ?

Harrison's 16th Ed. 704

- A. *M. tuberculosis*

- B. S. typhi
- C. Toxoplasma gondii
- D. All of the above

830 Hosts for salmonellae include ?

Harrison's 18th Ed. 1275

- A. Humans
- B. Monkey
- C. Dogs
- D. All of the above

Humans are the only hosts of S. Typhi & S. Paratyphi serotypes A, B, and C.

831 Incubation period for S. typhi ranges from ?

Harrison's 18th Ed. 1275

- A. 3 to 7 days
- B. 3 to 14 days
- C. 3 to 21 days
- D. 3 to 28 days

The incubation period for S. Typhi averages 10-14 days but ranges from 3 to 21 days depending on inoculum size and host's health & immune status.

832 Plasmid-mediated resistance was observed with which of the following drugs ?

Harrison's 18th Ed. 1275

- A. Chloramphenicol
- B. Ampicillin
- C. Trimethoprim
- D. All of the above

Multidrug-resistant (MDR) strains of S. Typhi contain plasmids encoding resistance to chloramphenicol, ampicillin and trimethoprim.

833 Which of the following is the commonest physical finding in enteric fever ?

Harrison's 18th Ed. 1276

- A. Coated tongue
- B. Abdominal tenderness
- C. Rose spots
- D. Hepatosplenomegaly

Physical findings in enteric fever include coated tongue (51-56%), rose spots (30%), splenomegaly (5-6%), abdominal tenderness (4-5%), hepatosplenomegaly (3-6%) & relative bradycardia at peak of high fever.

834 Which of the following is the commonest gastrointestinal symptom in enteric fever ?

Harrison's 18th Ed. 1276

- A. Anorexia
- B. Abdominal pain
- C. Vomiting
- D. Diarrhea

GI symptoms in enteric fever include anorexia (55%), abdominal pain (30-40%), nausea (18-24%), vomiting (18%), diarrhea (22-28%) and constipation (13-16%).

835 Which of the following is false about Rose spots in enteric fever ?

Harrison's 18th Ed. 1276

- A. Salmon-colored
- B. Blanching

- C. Maculopapular rash
- D. Located on face and limbs

836 Which of the following is false about Rose spots in enteric fever ?

Harrison's 18th Ed. 1276

- A. Appears at the end of second week
- B. Patients can have two or three crops of lesions
- C. Salmonella can be cultured from punch biopsies of lesions
- D. Difficult to detect in dark-skinned patients

Rose spots are a faint, salmon-colored, blanching, maculopapular rash primarily on trunk & chest, in ~30% of patients at the end of 1st week & resolves after 2-5 days. Salmonella can be cultured from punch biopsies of these lesions. Difficult to detect in dark skinned patients.

837 S. typhi enters the body through which part of the gut ?

Harrison's 16th Ed. 897

- A. Duodenum
- B. Jejunum
- C. Terminal ileum
- D. Colon

838 Specimens for culture of S. Typhi in enteric fever can be obtained from ?

Harrison's 18th Ed. 1276

- A. Blood
- B. Bone marrow
- C. Rose spots
- D. All of the above

For definitive diagnosis of enteric fever isolation of S. Typhi or S. Paratyphi from blood, bone marrow, rose spots, stool or intestinal secretions is required.

839 Yield of blood cultures for S. typhi is high during ?

Harrison's 18th Ed. 1276

- A. First week
- B. Second week
- C. Third week
- D. Fourth week

Yield of blood cultures is high (90%) during 1st week of infection & decreases to 50% by 3rd week.

840 Yield of stool cultures for S. typhi is high during ?

Harrison's 18th Ed. 1276

- A. First week
- B. Second week
- C. Third week
- D. All of the above

Stool cultures become positive during III week of infection in untreated patients.

841 Rate of chronic carriers of S. typhi is higher for all except ?

Harrison's 18th Ed. 1276

- A. Men
- B. Gall bladder infection with S. haematobium
- C. Cholelithiasis
- D. Carcinoma of gall bladder

Chronic carriage of S typhi is more common among women, infants, and persons with biliary abnormalities or concurrent gall bladder infection with Schistosoma haematobium.

842 Which of the following drugs is ineffective in treating enteric fever ?

Harrison's 18th Ed. 1277

- A. First generation cephalosporins
- B. Second generation cephalosporins
- C. Aminoglycosides
- D. All of the above

1st & 2nd generation cephalosporins & aminoglycosides are ineffective in treating clinical infections.

843 Appropriate oral antibiotic treatment should be given for what duration in chronic carriage of Salmonella ?

Harrison's 18th Ed. 1277

- A. 6 weeks
- B. 12 weeks
- C. 16 weeks
- D. 24 weeks

Patients with chronic carriage of Salmonella are treated for 4-6 weeks with an appropriate oral antibiotic.

844 Chronic carriers is defined as excretion of S. typhi in urine or stools for ?

Harrison's 18th Ed. 1276, Lancet 2005; 366: 749-62

- A. 3 months
- B. 6 months
- C. > 1 year
- D. > 2 year

Chronic asymptomatic carriers are defined as individuals who excrete S. typhi in their stools or urine for more than a year.

845 In immunocompetent patients, relapse rate in enteric fever is ?

Harrison's 16th Ed. 899

- A. ~ 2 %
- B. ~ 5 %
- C. ~ 10 %
- D. ~ 20 %

846 Which of the following typhoid vaccines is given orally ?

Harrison's 18th Ed. 1278

- A. Whole-cell vaccine
- B. Ty21a
- C. ViCPS
- D. Vi-rEPA

847 Which of the following is an attenuated S. typhi vaccine ?

Harrison's 18th Ed. 1278

- A. Whole-cell vaccine
- B. Ty21a
- C. ViCPS
- D. Vi-rEPA

848 Which of the following S. typhi vaccines has higher incidence of side effects ?

Harrison's 18th Ed. 1278

- A. Whole-cell vaccine
- B. Ty21a

C. ViCPS

D. Vi-rEPA

Ty21a is an oral live attenuated S. Typhi vaccine (given on days 1, 3, 5, & 7, with a booster every 5 years). Vi CPS is a parenteral vaccine consisting of purified Vi polysaccharide from the bacterial capsule (given in 1 dose, with a booster every 2 years). The old parenteral whole-cell typhoid/ paratyphoid A and B vaccine is no longer licensed, largely because of significant side effects. An acetone-killed whole-cell vaccine is available only for use by the US military. In Vi-rEPA vaccine, Vi is bound to a nontoxic recombinant protein.

849 Minimum age for vaccination for Ty21a is ?

Harrison's 18th Ed. 1278

- A. 1 years
- B. 3 years
- C. 4 years
- D. 6 years

Minimal age for vaccination for Ty21a is 6 years.

850 Minimum age for vaccination for Vi CPS is ?

Harrison's 18th Ed. 1278

- A. 1 years
- B. 2 years
- C. 4 years
- D. 6 years

Minimal age for vaccination for Vi CPS is 2 years.

851 Which of the following vaccines is licensed for paratyphoid fever ?

Harrison's 18th Ed. 1278

- A. Whole-cell vaccine
- B. Ty21a
- C. ViCPS
- D. None of the above

Currently, there is no licensed vaccine for paratyphoid fever.

852 Vi-rEPA vaccine is best related to which of the following ?

Harrison's 18th Ed. 1278

- A. Xanthomas
- B. Cold urticaria
- C. Pseudomonas aeruginosa exotoxin A
- D. Hypergammaglobulinemia

In Vi-rEPA vaccine, Vi is bound to a nontoxic recombinant protein that is identical to Pseudomonas aeruginosa exotoxin A.

853 Which of the following S. typhi vaccines has best 3-year cumulative efficacy ?

Harrison's 18th Ed. 1278

- A. Whole-cell vaccine
- B. Ty21a
- C. ViCPS
- D. All of the above

854 Which of the following HLA-linked genes is associated with protection against complicated typhoid fever ?

Lancet 2005; 366: 749-62

- A. HLA-DQB1*0201-3
- B. HLA-DQB1*0401/2

- C. HLA-DRQB1*04
- D. HLA-DRB1*12

HLA-linked genes play an important role in determining susceptibility or resistance to typhoid. HLADRB1* 0301/6/8, HLA-DQB1*0201-3, and tumour necrosis factor a (TNFA*2-308) were associated with susceptibility to typhoid fever, and HLA-DRQB1*04 and HLA-DQB1*0401/2 and TNFA*1(-308) were associated with lower risk. HLA-DRB1*12 is associated with protection against complicated typhoid fever.

855 Number of predicted genes in a complete DNA sequence of a multidrug resistant S. typhi isolate CT18 is ?

Lancet 2005; 366: 749-62

- A. 4599
- B. 5599
- C. 6599
- D. 7599

Number of predicted genes in a complete DNA sequence of a multidrug resistant S typhi isolate CT18 is 4599.

856 The nationality of Georges-Fernand-Isidor Widal was ?

- A. German
- B. French
- C. British
- D. Norwegian

Georges-Fernand-Isidor Widal; (born on March 9, 1862 in Dellys, Algeria and died in Paris on January 14, 1929) was a French physician.

857 Salmonella typhi strain used to prepare S. typhi O and S. typhi H antigens is ?

- A. 701
- B. 801
- C. 901
- D. 1001

Salmonella typhi strain used to prepare S. typhi O and S. typhi H antigens is 901.

858 Which of the following about Widal test is false ?

- A. Highest serum dilution producing positive agglutination is taken as titre
- B. Agglutination of O antigen appears as "matt" or "carpet"
- C. Agglutination of H antigens appears as loose or wooly
- D. None of the above

859 Chloramphenicol was introduced for the treatment of typhoid fever in ?

N Engl J Med 2002;347:1770

- A. 1948
- B. 1954
- C. 1961
- D. 1966

Chloramphenicol was introduced for the treatment of typhoid fever in 1948.

Chapter 169. Syphilis

860 Primary lesion of syphilis appear how many weeks after infection ?

Harrison's 18th Ed. 1380

- A. 2 - 6 weeks

- B. 6 - 12 weeks
- C. 12 - 24 weeks
- D. 24 - 60 weeks

After an incubation period averaging 2 - 6 weeks, a primary lesion appears. Incubation period rarely exceeds 6 weeks.

861 Median incubation period in humans of primary lesion of syphilis is ?

Harrison's 18th Ed. 1381

- A. ~ 7 days
- B. ~ 14 days
- C. ~ 21 days
- D. ~ 28 days

The median incubation period in humans is ~21 days.

862 Spirochaetale that is pathogenic for humans is ?

Harrison's 18th Ed. 1380

- A. Leptospira
- B. Borrelia
- C. Treponema
- D. All of the above

Spirochaetales include three genera pathogenic for humans - Leptospira (Leptospirosis), Borrelia (Relapsing fever & Lyme disease) and Treponema (Treponematoses).

863 Which Treponema subspecies causes 'Yaws' ?

Harrison's 18th Ed. 1380

- A. T. pallidum
- B. T. pertenue
- C. T. endemicum
- D. T. carateum

864 Which Treponema subspecies causes 'Pinta' ?

Harrison's 18th Ed. 1380

- A. T. pallidum
- B. T. pertenue
- C. T. endemicum
- D. T. carateum

Treponema pallidum causes venereal syphilis. T. pallidum subspecies pertenue causes yaws. T. pallidum subspecies endemicum causes endemic syphilis or bejel. T. carateum causes pinta.

865 Endemic syphilis is also called ?

Harrison's 18th Ed. 1380

- A. Bejel
- B. Siti
- C. Dichuchwa
- D. All of the above

Endemic syphilis is also called bejel, siti, dichuchwa, njovera or skerljevo and is caused by T. pallidum subspecies endemicum.

866 PCR amplification of which gene can differentiate etiologic agents of venereal syphilis, yaws and bejel ?

Harrison's 18th Ed. 1380

- A. stf
- B. tpr
- C. mof

D. xqr

Molecular signatures that can differentiate the causative agents of venereal syphilis, yaws & bejel have been identified by polymerase chain reaction amplification of tpr genes & restriction digestion.

867 Virulent strains of *T. pallidum* are grown in ?

Harrison's 18th Ed. 1380

- A. Mice
- B. Horse
- C. Rabbits
- D. Cow

*Virulent strains of *T. pallidum* are grown in rabbits.*

868 The most common cause of genital ulceration in most developing countries is ?

Harrison's 17th Ed. 1039

- A. Chancroid
- B. Syphilis
- C. Genital herpes
- D. Lymphogranuloma venereum (LGV)

The most common cause of genital ulceration in most developing countries is genital herpes.

869 Which of the following about *T. pallidum* is false ?

Harrison's 18th Ed. 1381

- A. *T. pallidum* can penetrate intact mucous membranes
- B. Blood from patient of incubating syphilis is infectious
- C. Incubation period rarely exceeds 6 weeks
- D. None of the above

870 50% infectious dose for intradermal inoculation in humans is ?

Harrison's 18th Ed. 1381

- A. 57 organisms
- B. 157 organisms
- C. 257 organisms
- D. 357 organisms

50% infectious dose for intradermal inoculation in humans is 57 organisms.

871 What is the treponeme concentration in tissues before a clinical lesion appears ?

Harrison's 18th Ed. 1381

- A. 10^5 / gram
- B. 10^6 / gram
- C. 10^7 / gram
- D. 10^8 / gram

Treponeme concentration in tissues of 10^7 /gram produces a clinical lesion.

872 What is the average inoculum of infectious organisms for naturally acquired syphilis ?

Harrison's 18th Ed. 1381

- A. 500 - 1000
- B. 5000 - 10000
- C. 50000 - 100000
- D. 500000 - 1000000

The average inoculum of infectious organisms for naturally acquired syphilis is 500 - 1000.

873 Primary lesion at the site of inoculation usually persists for ?

Harrison's 18th Ed. 1381

- A. 2 - 4 weeks
- B. 4 - 6 weeks
- C. 6 - 12 weeks
- D. 12 - 18 weeks

Primary lesion at the site of inoculation usually persists for 4 - 6 weeks and then heals spontaneously. But the accompanying lymphadenopathy may persist for months.

874 Mucocutaneous manifestations of secondary syphilis appear how many weeks after the chancre heals ?

Harrison's 18th Ed. 1381

- A. ~ 3 - 6 weeks
- B. ~ 6 - 8 weeks
- C. ~ 10 - 16 weeks
- D. ~ 16 - 28 weeks

Mucocutaneous manifestations of secondary syphilis usually appear ~6 - 8 weeks after chancre heals.

875 Secondary lesions subside within what time ?

Harrison's 18th Ed. 1381

- A. 2 - 6 weeks
- B. 6 - 12 weeks
- C. 12 - 16 weeks
- D. 18 - 24 weeks

Secondary lesions subside within 2 - 6 weeks and the infection enters a latent stage which is detectable only by serologic testing.

876 Which of the following is not a presentation of tertiary syphilis ?

Harrison's 18th Ed. 1381

- A. Condylomata lata
- B. Gumma
- C. Cardiovascular syphilis
- D. Symptomatic neurosyphilis

Most common types of tertiary disease are gumma (benign granulomatous lesion), cardiovascular syphilis (ascending aorta aneurysm) & symptomatic neurosyphilis (tabes dorsalis and paresis).

877 Which of the following about primary chancre is false ?

Harrison's 18th Ed. 1382

- A. Begins as a single painless papule
- B. Cartilaginous consistency on palpation
- C. Multiple primary lesions more common among men with concurrent HIV infection
- D. None of the above

878 Which of the following genital lesion is painless ?

Harrison's 18th Ed. 1382

- A. Herpes simplex virus infection
- B. Donovanosis
- C. Chancroid
- D. Recurrent genital herpes

Donovanosis is usually seen as a granulomatous ulcer that is painless but friable.

879 Which of the following is false about inguinal lymph-adenopathy that accompanies primary syphilitic lesion ?

Harrison's 18th Ed. 1382

- A. Appears within 1 week of lesion onset

- B. Unilateral
- C. Nonsuppurative
- D. Painless

Inguinal lymphadenopathy that accompanies the primary syphilitic lesion appears within 1 week of lesion onset, is firm, nonsuppurative, painless and bilateral.

880 Lues maligna refers to ?

Harrison's 18th Ed. 1382

- A. Eye lesion
- B. Weight loss
- C. Skin lesion
- D. Alopecia

Severe necrotic skin lesions of secondary syphilis are called lues maligna.

881 Which of the following is false about skin rash of secondary syphilis ?

Harrison's 18th Ed. 1382

- A. Nonpruritic macules initially
- B. Papular lesions involve palms & soles
- C. More than one form is present simultaneously
- D. None of the above

Skin rash of secondary syphilis consists of macular, papular, papulosquamous, and pustular syphilides. More than one form is present simultaneously. Initial lesions are nonpruritic macules on the trunk & proximal extremities which progress to papular lesions that involve palms & soles.

882 Which of the following is a highly infectious lesion in syphilis ?

Harrison's 18th Ed. 1382

- A. Chancre
- B. Lues maligna
- C. Condylomata lata
- D. Mucous patch

In secondary syphilis, papules enlarge to form highly infectious lesions called condylomata lata in perianal region, vulva, and scrotum.

883 Which of the following is false about mucous patches in secondary syphilis ?

Harrison's 18th Ed. 1382

- A. Superficial mucosal erosions
- B. Involve oral or genital mucosa
- C. Painful
- D. Silver-gray erosion surrounded by red periphery

Superficial mucosal erosions or mucous patches of secondary syphilis involve oral or genital mucosa, are painless silver-gray erosion surrounded by a red periphery.

884 Which of the following papulosquamous disease shares many clinical features with secondary syphilis ?

Harrison's 18th Ed. 405

- A. Psoriasis
- B. Lichen planus
- C. Pityriasis rosea
- D. Dermatophytosis

Clinical features of Pityriasis rosea like rash often preceded by herald patch, oval to round plaques with trailing scale, affecting trunk and eruption lines up in skin folds giving a "fir tree" like appearance shares many clinical features with secondary syphilis in which palms & soles are spared.

885 Scattered, poorly circumscribed patches of alopecia seen in secondary stage of syphilis is termed as ?

Harrison's 18th Ed. 407

- A. Moth eaten appearance
- B. Cheese spread appearance
- C. Salt and pepper appearance
- D. Wild pluck appearance

Scattered, poorly circumscribed patches of alopecia with a "moth-eaten" appearance are a manifestation of secondary stage of syphilis.

886 Which of the following ocular finding is classic of secondary syphilis ?

Harrison's 18th Ed. 1382

- A. Pupillary abnormalities
- B. Optic neuritis
- C. Iritis or uveitis
- D. Retinitis

Ocular findings in secondary syphilis include pupillary abnormalities, optic neuritis and the classic iritis or uveitis. Optic atrophy occurs in tabes.

887 Which of the following is false about hepatic involvement in syphilis ?

Harrison's 18th Ed. 1382

- A. Usually asymptomatic
- B. Unusually high serum alkaline phosphatase
- C. No cholestasis
- D. None of the above

Hepatic involvement is common in syphilis though asymptomatic. Unusually high serum alkaline phosphatase without cholestasis with some hepatocellular damage are common.

888 Diagnosis of latent syphilis is established by ?

Harrison's 18th Ed. 1383

- A. Positive serologic tests for syphilis
- B. Normal CSF examination
- C. Absence of clinical manifestations of syphilis
- D. All of the above

Positive serologic tests for syphilis, with normal CSF examination & absence of clinical manifestations of syphilis indicate a diagnosis of latent syphilis.

889 Meningovascular syphilis manifests at what time after infection ?

Harrison's 18th Ed. 1383

- A. 1 - 5 years
- B. 5 - 10 years
- C. 10 - 15 years
- D. 15 - 20 years

890 Which of the following comes last in the clinical spectrum of symptomatic neurosyphilis ?

Harrison's 18th Ed. 1383

- A. Meningeal syphilis
- B. Meningovascular syphilis
- C. Tabes dorsalis
- D. General paresis

In symptomatic neurosyphilis, onset of symptoms are <1 year after infection for meningeal syphilis, at 5 - 10 years for meningovascular syphilis, at 20 years for general paresis & at 25 - 30 years for tabes dorsalis.

891 Patients presenting with uveitis or iritis frequently have ?*Harrison's 18th Ed. 1383*

- A. Meningeal syphilis
- B. Meningovascular syphilis
- C. Tabes dorsalis
- D. General paresis

*Patients presenting with uveitis or iritis frequently have meningeal syphilis.***892 Meningeal syphilis may present with ?***Harrison's 18th Ed. 1383*

- A. Cranial nerve involvement
- B. Seizures
- C. Changes in mental status
- D. All of the above

*Meningeal syphilis may present with headache, nausea, vomiting, neck stiffness, cranial nerve involvement, seizures, and changes in mental status.***893 Meningeal syphilis may be concurrent with or may follow ?***Harrison's 18th Ed. 1383*

- A. Primary syphilis
- B. Secondary syphilis
- C. Tertiary syphilis
- C. Any of the above

*Meningeal syphilis may be concurrent with or may follow secondary syphilis.***894 Most common presentation of meningovascular syphilis is ?***Harrison's 18th Ed. 1383*

- A. Argyll Robertson pupils
- B. Illusions, delusions, hallucinations
- C. Stroke in MCA territory of a young adult
- D. Loss of position sensation

*Most common presentation of meningovascular syphilis is stroke syndrome involving middle cerebral artery in a relatively young adult.***895 Stroke in meningovascular syphilis is preceded by ?***Harrison's 18th Ed. 1383*

- A. Painful sensory neuropathy
- B. Visual disturbances
- C. Skin eruption
- D. Subacute encephalitic prodrome

*Gradually progressive vascular syndrome (stroke) in meningovascular syphilis is preceded by a subacute encephalitic prodrome consisting of headache, vertigo, insomnia & psychological abnormalities.***896 Which of the following is not a manifestation of general paresis ?***Harrison's 18th Ed. 1383*

- A. Argyll Robertson pupils
- B. Areflexia
- C. Decrease in recent memory
- D. Illusions, delusions, hallucinations

*Manifestations of general paresis reflect widespread late parenchymal damage that include personality, affect, reflexes (hyperactive), eye (Argyll Robertson pupils), sensorium (illusions, delusions, hallucinations), intellect (a decrease in recent memory and in the capacity for orientation, calculations, judgment, and insight), and speech.***897 Which of the following structures is involved in tabes dorsalis ?***Harrison's 18th Ed. 1384*

- A. Posterior columns
- B. Dorsal roots
- C. Dorsal root ganglia
- D. All of the above

*Tabes dorsalis is a late manifestation of syphilis with presentation due to demyelination of posterior columns, dorsal roots & dorsal root ganglia.***898 Which of the following is a manifestation of Tabes dorsalis ?***Harrison's 18th Ed. 1384*

- A. Ataxic wide-based gait
- B. Argyll Robertson pupil
- C. Areflexia
- D. All of the above

*Tabes dorsalis is a late manifestation of syphilis that presents as Argyll Robertson pupil, ataxic wide-based gait & footslap, paresthesia, bladder disturbances, impotence, areflexia & loss of position, deep pain & temperature sensations, Charcot's joints & perforating ulceration of feet.***899 Visceral crisis in tabes refers to ?***Harrison's 17th Ed. 2595*

- A. Acute abdominal pain
- B. Acute vomiting
- C. Acute abdominal pain with vomiting
- D. Any of the above

*Acute abdominal pain with vomiting in tabes is termed as visceral crisis. Occurs in 15 - 30% of patients.***900 Cardinal sign of tabes is ?***Harrison's 17th Ed. 2595*

- A. Loss of reflexes in legs
- B. Impaired position & vibratory sense
- C. Romberg's sign
- D. All of the above

*Cardinal signs of tabes are loss of reflexes in legs, impaired position & vibratory sense, Romberg's sign and, bilateral Argyll Robertson pupils (fail to constrict to light but accommodate).***901 Which of the following is false about syphilitic aneurysms ?***Harrison's 18th Ed. 1384*

- A. Saccular aneurysm
- B. Involves ascending aorta
- C. Frequently lead to dissection
- D. Due to endarteritis obliterans of vasa vasorum

*Syphilitic aneurysms are usually saccular, involve ascending aorta and do not lead to dissection. These cardiovascular manifestations are due to endarteritis obliterans of vasa vasorum, which supply blood to large vessels. Syphilitic periaortitis & mesoaortitis damage elastic fibers with weakening of aortic wall. ~90% of syphilitic aneurysms are located in ascending aorta or aortic arch.***902 Which of the following about cardiovascular syphilis is false ?***Harrison's 18th Ed. 1384*

- A. Endarteritis obliterans of vasa vasorum
- B. Symptoms usually appear 10 to 40 years after infection
- C. Linear calcification of descending aorta on chest x-ray
- D. Syphilitic aneurysms are saccular & do not lead to dissection

Radiological sign of cardiovascular syphilis is appearance of linear calcification of ascending aorta.

903 Which is the commonest valvular lesion in syphilis ?

Harrison's 18th Ed. 1384

- A. Aortic stenosis
- B. Aortic regurgitation
- C. Mitral regurgitation
- D. Tricuspid regurgitation

Cardiovascular manifestations that come up 10 - 40 years after infection are uncomplicated aortitis, aortic regurgitation, saccular aneurysm of ascending aorta and coronary ostial stenosis.

904 Till what time, adequate treatment of syphilis mother could prevent congenital syphilis ?

Harrison's 18th Ed. 1384

- A. Before 16th week of pregnancy
- B. Before 24th week of pregnancy
- C. Before 28th week of pregnancy
- D. Before 32nd week of pregnancy

Adequate treatment of the mother before 16th week of pregnancy prevents fetal damage & treatment of mother before third trimester adequately treats the infected fetus.

905 Which is the earliest sign of congenital syphilis ?

Harrison's 18th Ed. 1384

- A. Rhinitis
- B. Superficial desquamation
- C. Petechiae
- D. Papulosquamous lesions

Earliest sign of congenital syphilis (2 - 6 weeks after birth) is usually rhinitis, or "snuffles" which is soon followed by other mucocutaneous lesions which include bullae (syphilitic pemphigus), vesicles, superficial desquamation, petechiae, and papulosquamous lesions, mucous patches & condylomata lata.

906 Which out of the following is the most common early manifestation of congenital syphilis ?

Harrison's 18th Ed. 1384

- A. Bone changes
- B. Hepatosplenomegaly
- C. Lymphadenopathy
- D. Anemia

*Most common early manifestations are bone changes (61%) including osteochondritis, osteitis and periostitis; hepatosplenomegaly (50%); lymphadenopathy (32%); anemia (34%); jaundice (30%); thrombocytopenia; and leukocytosis. CNS invasion by *T. pallidum* is detectable in 22% of infected neonates.*

907 Neonatal death in congenital syphilis is usually due to ?

Harrison's 18th Ed. 1384

- A. Pulmonary hemorrhage
- B. Secondary bacterial infection
- C. Severe hepatitis
- D. Any of the above

Neonatal death is usually due to pulmonary hemorrhage, secondary bacterial infection, or severe hepatitis.

908 Which of the following is a feature of syphilis ?

Harrison's 18th Ed. 1384

- A. Clutton's joints
- B. Hutchinson's teeth
- C. Argyll Robertson pupils
- D. All of the above

909 In syphilis, Clutton's joints refer to ?

Harrison's 18th Ed. 1384, 2846

- A. Frozen shoulder
- B. Pes cavus
- C. Bilateral knee effusions
- D. Avascular necrosis of hip joint

Bilateral knee effusions are known as Clutton's joints. Clutton's joint is a late manifestation of congenital syphilis that typically develops between 8 & 15 years of age,

910 Which of the following is false for upper central incisors in syphilis (Hutchinson's teeth) ?

Harrison's 18th Ed. 1384, 268

- A. Centrally notched
- B. Widely spaced
- C. Lower central incisors
- D. Peg-shaped

Features of Hutchinson's teeth are central notching, widely spaced, peg-shaped upper central incisors.

911 In congenital syphilis, the affected molars are called ?

Harrison's 18th Ed. 1384, 268

- A. "Mulberry" molars
- B. "Saddle" molars
- C. "Saber" molars
- D. All of the above

In congenital syphilis, the affected molars are called "mulberry" molars (sixth-year molars with multiple, poorly developed cusps).

912 Which of the following is a feature of syphilis ?

Harrison's 18th Ed. 273 Table 32-4

- A. Bald tongue
- B. Hairy tongue
- C. Strawberry tongue
- D. Rasperry tongue

913 Abnormal facies in congenital syphilis include all except ?

Harrison's 16th Ed. 981

- A. Frontal bossing
- B. Saddle nose
- C. Poorly developed maxillae
- D. Small pinna of ear

914 Anterior tibial bowing in syphilis is called ?

Harrison's 18th Ed. 1384

- A. Nano shins
- B. Saber shins
- C. Cooper shins
- D. Weber shins

915 In syphilis, 'Rhagades' refers to ?

Harrison's 16th Ed. 981

- A. Linear scars at angles of mouth and nose
- B. Loss of eyebrows
- C. Small pinna of ear
- D. Crusting of the lips

916 Which of the following tests is not useful in detection of *T. pallidum* ?

Harrison's 18th Ed. 1384

- A. Culture
- B. Dark-field microscopic examination
- C. Immunofluorescence or immunohistochemical methods
- D. Fluorescein-conjugated polyclonal antitreponemal antibody

T. pallidum cannot be detected by culture.

917 Serologic tests for syphilis are reactive in ?

Harrison's 18th Ed. 1384

- A. Yaws
- B. Pinta
- C. Endemic syphilis
- D. All of the above

Both nontreponemal & treponemal serologic test for syphilis are reactive in any treponemal infection including yaws, pinta and endemic syphilis.

918 Which of the following is not a treponemal test ?

Harrison's 18th Ed. 1385

- A. Fluorescent treponemal antibody-absorbed (FTA-ABS) test
- B. Microhemagglutination assay for *T. pallidum* (MHA-TP)
- C. Rapid plasmin reagin (RPR test)
- D. Serodia TP-PA test

Nontreponemal antibody tests for syphilis are RPR & VDRL tests. They measure IgG & IgM against cardiolipin-lecithin-cholesterol antigen complex.

919 'Prozone phenomenon' is best related to ?

Harrison's 18th Ed. 1385

- A. Serum dilution
- B. Serum temperature
- C. Serum pH
- D. Serum colour

VDRL test that is nonreactive or weakly reactive with undiluted serum but is positive at higher serum dilutions is called prozone phenomenon.

920 Which of the following drugs is ineffective in the treatment of acquired syphilis ?

Harrison's 18th Ed. 1386

- A. Quinolones
- B. Tetracyclines
- C. Erythromycin
- D. Cephalosporins

921 Which of the following drugs is inactive against *T. pallidum* ?

Harrison's 18th Ed. 1386

- A. Spectinomycin
- B. Tetracyclines
- C. Sulfonamides
- D. Cephalosporins

*Sulfonamides and quinolones are inactive against *T. pallidum*. Aminoglycosides & spectinomycin inhibit *T. pallidum* only in very large doses*

922 For penicillin-allergic patients with early syphilis, which of the following medicines can be used ?

Harrison's 18th Ed. 1387

- A. Doxycycline
- B. Ceftriaxone
- C. Azithromycin
- D. All of the above

For penicillin-allergic patients with syphilis, doxycycline or tetracycline is recommended. Ceftriaxone & Azithromycin are effective for early syphilis.

923 Which of the following in CSF examination, provides the most sensitive index of response to treatment of neurosyphilis ?

Harrison's 18th Ed. 1387

- A. Elevated levels of CSF protein
- B. CSF VDRL titer
- C. CSF pleocytosis
- D. All of the above

924 Jarisch-Herxheimer Reaction is most common following treatment of ?

Harrison's 18th Ed. 1388

- A. Primary syphilis
- B. Secondary syphilis
- C. Early latent syphilis
- D. None of the above

Jarisch-Herxheimer reaction occurs in ~50% of patients with primary syphilis, 90% of those with secondary syphilis, and a lower proportion of persons with later-stage disease.

925 Which of the following tests is not useful in following the response to therapy in patients of syphilis ?

Harrison's 16th Ed. 984

- A. Quantitative VDRL titer
- B. Quantitative RPR titer
- C. FTA-ABS and agglutination tests
- D. All of the above

926 Which of the following is not a cause of False-Positive Reactions in Nontreponemal Serologic Tests for Syphilis ?

Harrison's 16th Ed. 982

- A. Recent viral illness or immunization
- B. Genital herpes
- C. HIV infection
- D. Typhoid

927 Which of the following is not a cause of false-positive reactions in nontreponemal serologic tests for syphilis ?

Harrison's 16th Ed. 982

- A. Malaria
- B. Parenteral drug use
- C. Recent trauma
- D. Aging

928 Which of the following is false about syphilitic hepatitis ?

Harrison's 16th Ed. 981

- A. Unusually high serum alkaline phosphatase
- B. Histologically different from viral hepatitis
- C. Cholestasis
- D. None of the above

929 Combination of optic neuritis & spastic ataxic paraparesis suggests which of the following ?

Harrison's 17th Ed. 2484

- A. Multiple sclerosis (MS)
- B. CNS syphilis
- C. Vitamin B₁₂ deficiency
- D. All of the above

Combination of optic neuritis & spastic ataxic paraparesis suggest optic nerve & spinal cord disease - multiple sclerosis (MS), CNS syphilis & vitamin B₁₂ deficiency.

Chapter 171. Leptospirosis

930 Which of the following is Spirochaetale ?

Harrison's 18th Ed. 1048

- A. Leptospira
- B. Borrelia
- C. Treponema
- D. All of the above

931 Which of the following about Leptospire is false ?

Harrison's 18th Ed. 1392

- A. Coiled, thin, highly motile organisms with hooked ends
- B. Stain poorly
- C. Can be seen by dark-field microscopic examination
- D. None of the above

932 The most important reservoir of Leptospire is ?

Harrison's 18th Ed. 1393

- A. Rats
- B. Cat
- C. Fish
- D. Birds

Leptospirosis is a zoonotic disease. Most important sources of transmission to humans are rats, dogs, cattle, and pigs.

933 Leptospire infect humans usually through ?

Harrison's 18th Ed. 1393

- A. Intact skin
- B. Nails
- C. Conjunctival mucosa
- D. Hair follicle

Leptospire infect humans usually through conjunctival mucosa and possibly oral or tonsillar mucosa or through macerated, punctured, or abraded skin.

934 The incubation period of leptospirosis is in the range of ?

Harrison's 18th Ed. 1393

- A. 2 to 20 days
- B. 2 to 30 days
- C. 2 to 40 days
- D. 2 to 50 days

The incubation period averages 5 - 14 days (range 2 - 30 days). Leptospire can be isolated from blood during the first 3 - 10 days of clinical illness.

935 In the host, Leptospire persist in ?

Harrison's 18th Ed. 1393

- A. Renal tubules

- B. Hepatic ducts
- C. Intestinal flora
- D. Saliva

Leptospire traverse the interstitial spaces of kidney, penetrate basement membrane of proximal renal tubules, cross through proximal renal tubule epithelial cells, and become adherent to proximal renal tubular brush border, from where they are excreted in the urine.

936 Transmission of leptospire is rare through ?

Harrison's 18th Ed. 1393

- A. Direct contact with urine
- B. Direct contact with blood
- C. Direct contact with tissue
- D. Human-to-human transmission

Human-to-human transmission does not occur.

937 Occupational groups at high risk of leptospirosis are all except ?

Harrison's 18th Ed. 1393

- A. Veterinarians
- B. Slaughterhouse workers
- C. Sewage workers
- D. Medical Laboratory technicians

938 All forms of leptospire damage ?

Harrison's 17th Ed. 1049

- A. Epidermis
- B. Oral mucosa
- C. Wall of small blood vessels
- D. Urinary epithelium

939 In kidney, leptospire causes ?

Harrison's 18th Ed. 1394

- A. Interstitial nephritis
- B. Glomerulonephritis
- C. Perinephritis
- D. All of the above

In leptospirosis, acute & chronic inflammation within kidney is associated with acute tubular necrosis & interstitial nephritis.

940 The organ invariably involved in leptospirosis is ?

Harrison's 17th Ed. 1049

- A. Eye
- B. Kidney
- C. Liver
- D. Pancreas

941 Even when antibodies are formed, leptospire persist for weeks / months at all sites in host except ?

Harrison's 18th Ed. 1393

- A. Eye
- B. Proximal renal tubules
- C. Brain
- D. Muscle

942 Which of the following is conspicuous during immune phase of leptospirosis ?

Harrison's 18th Ed. 1395

- A. Jarisch-Herxheimer reaction

- B. Hemolytic anemia
C. Aseptic meningitis
D. Peripheral neuropathy
- 943 Severe Leptospirosis (Weil's Syndrome) is characterized by ?**
Harrison's 18th Ed. 1394
A. Jaundice
B. Renal dysfunction
C. Hemorrhagic diathesis
D. All of the above
- 944 The most common clinical finding in leptospirosis is ?**
Harrison's 18th Ed. 1394
A. Fever with conjunctival suffusion
B. Muscle tenderness
C. Lymphadenopathy
D. Skin rash
- 945 Test that helps to differentiate leptospirosis from viral hepatitis is ?**
Harrison's 18th Ed. 1395
A. Serum bilirubin
B. Serum alkaline phosphatase
C. Serum creatine phosphokinase
D. Serum lactic dehydrogenase
- 946 Temperature-pulse dissociation (relative bradycardia) occurs in ?**
Harrison's 17th Ed. 1050
A. Typhoid fever
B. Brucellosis
C. Leptospirosis
D. All of the above
- 947 Most common radiographic finding in severe leptospirosis is ?**
Harrison's 18th Ed. 1395
A. Pleural effusion
B. Patchy alveolar pattern
C. Hilar lymphadenopathy
D. All of the above
- 948 Radiographic abnormalities in severe leptospirosis most often affect ?**
Harrison's 17th Ed. 1050
A. Lower lobes
B. Upper lobes
C. Middle lobes
D. All of the above
- 949 In leptospirosis, antibodies are generally detectable by ?**
Harrison's 18th Ed. 1394
A. First week of illness
B. Second week of illness
C. Third week of illness
D. Fourth week of illness
- 950 Tests with diagnostic value in leptospirosis include ?**
Harrison's 17th Ed. 1050
A. Microscopic agglutination test (MAT)
B. ELISA
C. Indirect hemagglutination test
D. All of the above
- 951 For isolation of leptospire from body fluids or tissues, which medium is useful ?**
Harrison's 18th Ed. 1393
A. Ellinghausen-McCullough-Johnson-Harris (EMJH) medium
B. Fletcher medium
C. Korthoff medium
D. All of the above
- 952 Leptospire do not remain viable in anticoagulated blood after ?**
Harrison's 18th Ed. 1395
A. 11 days
B. 17 days
C. 24 days
D. 27 days
- 953 Which of the following illness has a strong similarity in epidemiology and clinical presentation with leptospirosis ?**
Harrison's 17th Ed. 1050
A. Malaria
B. Viral hepatitis
C. Dengue
D. Hantavirus infection
- 954 Which of the following drugs is not effective in severe cases of leptospirosis ?**
Harrison's 18th Ed. 1396 Table 171-1
A. IV penicillin G
B. Tetracycline
C. Erythromycin
D. Cotrimoxazole
- 955 Drug indicated for chemoprophylaxis against leptospirosis is ?**
Harrison's 18th Ed. 1396 Table 171-1
A. Doxycycline
B. Erythromycin
C. Cephalosporin
D. Ampicillin
- 956 Accentuated petechiae in body folds (Pastia's lines) is characteristic of ?**
Harrison's 18th Ed. 1174
A. Scarlet fever
B. Kawasaki disease
C. Streptococcal toxic shock syndrome
D. Staphylococcal toxic shock syndrome

Chapter 321. Rheumatoid Arthritis

957 Rheumatoid arthritis (RA) is a chronic disease of ?

Harrison's 17th Ed. 2083

- A. Bone
- B. Joints
- C. Muscle
- D. Multisystem

Rheumatoid arthritis (RA) is a chronic multisystem disease of unknown cause.

958 Which of the following is false about established RA ?

Harrison's 17th Ed. 2083

- A. Persistent inflammatory synovitis
- B. Involves peripheral joints in a symmetric distribution
- C. Cartilage damage & bone erosions
- D. None of the above

Characteristic feature of established RA is persistent inflammatory synovitis causing cartilage damage, bone erosions & disturbing joint integrity, involving peripheral joints in a symmetric distribution.

959 The hallmark of rheumatoid arthritis is ?

Harrison's 18th Ed. 2742

- A. Synovial inflammation
- B. Cartilage damage
- C. Bone erosions
- D. Systemic manifestations

The potential of the synovial inflammation is the hallmark of the disease.

960 Synovial membrane in rheumatoid arthritis is characterized by ?

N Engl J Med 2001;344:907

- A. Hyperplasia
- B. Increased vascularity
- C. Infiltrate of inflammatory cells
- D. All of the above

Synovial membrane in rheumatoid arthritis is characterized by hyperplasia, increased vascularity & infiltrate of inflammatory cells (CD4+ T cells).

961 Age of onset of RA is most frequent during which decade of life ?

Harrison's 17th Ed. 2083

- A. II and III
- B. III and IV
- C. IV and V
- D. V and VI

The age of onset of RA is most frequent during fourth and fifth decades of life.

962 The incidence of RA decreases after the age of ?

Harrison's 18th Ed. 2738

- A. 45
- B. 55
- C. 65
- D. 75

The incidence of RA increases between 25 and 55 years of age, after which it plateaus until the age of 75 and then decreases.

963 Women are affected by RA approximately how many times more often than men ?

Harrison's 17th Ed. 2083

- A. Two times
- B. Three times
- C. Four times
- D. Five times

Women are affected by RA ~three times more often than men.

964 Which of the following is a major genetic risk factor for RA ?

Harrison's 18th Ed. 2741

- A. HLA-DR2 (DRβ1*1501)
- B. HLA-DR3 (DRβ1*0301)
- C. HLA-DR4 (DRβ1*0401)
- D. HLA-DR5 (DRβ1*1101)

Class II major histocompatibility complex allele HLA-DR4 (DRβ1*0401) is a major genetic risk factors for RA. HLA-DR5 (DRβ1*1101), HLA-DR2 (DRβ1*1501), HLA-DR3 (DRβ1*0301), and HLA-DR7 (DRβ1*0701) may protect against the development of RA.

965 Which of the following is regarded as susceptibility gene for RA ?

Harrison's 17th Ed. 2084

- A. PTPN22
- B. FcRL3
- C. CTLA4
- D. All of the above

PTPN22 (a phosphatase involved in antigen receptor signaling in lymphocytes), FcRL3 (a molecule involved in regulating B cell activation), PADI4 (enzyme involved in conversion of citrulline to arginine in proteins), and CTLA4 (a molecule involved in regulation of T cell activation) are regarded as susceptibility genes for RA.

966 Which of the following susceptibility genes for RA does not convey risk for other autoimmune diseases ?

Harrison's 17th Ed. 2084

- A. PTPN22
- B. FcRL3
- C. CTLA4
- D. PADI4

Except for PADI4, these genes also appear to convey risk for other autoimmune diseases.

967 Earliest lesion in rheumatoid synovitis is ?

Harrison's 17th Ed. 2084

- A. Decrease in number of synovial lining cells
- B. Increase in number of synovial lining cells
- C. Decrease in size of synovial lining cells
- D. Increase in size of synovial lining cells

Microvascular injury & an increase in the number of synovial lining cells are the earliest lesions in rheumatoid synovitis.

968 Predominant infiltrating cell in RA is ?

Harrison's 17th Ed. 2084

- A. T lymphocyte
- B. B lymphocyte
- C. Macrophages
- D. Dendritic cells

Predominant infiltrating cell in RA is T lymphocyte - CD4+ T cells predominate over CD8+ T cells.

969 In rheumatoid synovium, CD4+ and CD8+ T cells express the early activation antigen called ?

Harrison's 17th Ed. 2084

- A. CD49
- B. CD59
- C. CD69
- D. CD79

In rheumatoid synovium, CD4+ memory T cells & CD8+ T cells express early activation antigen CD69.

970 Enzymes like collagenase & cathepsins are produced by ?

Harrison's 17th Ed. 2084

- A. Activated mast cells
- B. Activated synovial fibroblasts
- C. Activated mesenchymal stromal cells
- D. Osteoclasts

In RA, synovial fibroblasts are activated to produce collagenase & cathepsins that degrade components of articular matrix particularly in the lining layer & at the interface with bone & cartilage.

971 Activity of chemokines & cytokines result in which of the features of rheumatoid synovitis ?

Harrison's 17th Ed. 2084

- A. Synovial tissue inflammation
- B. Synovial fluid inflammation
- C. Systemic manifestations of RA
- D. All of the above

In rheumatoid synovitis, activity of chemokines & cytokines result in synovial tissue inflammation, synovial fluid inflammation, synovial proliferation & cartilage & bone damage as well as systemic manifestations of RA.

972 Which of the following about rheumatoid arthritis is false ?

Harrison's 17th Ed. 2084

- A. Immune mediated disease
- B. Damage initiated by CD4+ T cells
- C. Hallmark is synovial inflammation
- D. None of the above

973 TNF- α blocking drugs used for rheumatoid arthritis are ?

N Engl J Med 2004;350:2167-79

- A. Etanercept
- B. Infliximab
- C. Adalimumab
- D. All of the above

974 TNF- α , an inflammatory cytokine, is released by ?

N Engl J Med 2004;350:2167-79

- A. Activated monocytes
- B. Macrophages
- C. T lymphocytes
- D. All of the above

975 The two receptors of TNF- α are ?

N Engl J Med 2004;350:2167-79

- A. Type 1 TNF receptor (p50) & type 2 TNF receptor (p70)
- B. Type 1 TNF receptor (p55) & type 2 TNF receptor (p75)
- C. Type 1 TNF receptor (p60) & type 2 TNF receptor (p80)
- D. Type 1 TNF receptor (p65) & type 2 TNF receptor (p85)

TNF- α is a central component in the cascade of cytokines induced in RA, exerts its effects through binding to two cell surface receptors, type 1 TNF receptor (p55) & type 2 TNF receptor (p75), found on immune, inflammatory & endothelial cells.

976 Which of the following cytokines drive inflammation in rheumatoid arthritis ?

N Engl J Med 2001;344:907

- A. Interleukin-1
- B. Interleukin-6
- C. TNF α
- D. All of the above

Interleukin-1, interleukin-6 & TNF α are key cytokines that drive inflammation in rheumatoid arthritis.

977 Rheumatoid factor is produced by ?

N Engl J Med 2001;344:907

- A. B cell
- B. T cell
- C. Macrophage
- D. Dendritic cell

Activated CD4+ T cells stimulate B cells to produce immunoglobulins, including rheumatoid factor.

978 Which of the following is an antiinflammatory cytokine ?

N Engl J Med 2001;344:907

- A. Interleukin-1
- B. Interleukin-6
- C. Interleukin-10
- D. TNF α

Interleukin-10 and interleukin-4 are antiinflammatory cytokines.

979 Interleukin-4 inhibits the production of ?

N Engl J Med 2001;344:907

- A. Interleukin-1
- B. Interleukin-6
- C. Interleukin-8
- D. All of the above

Interleukin-4 inhibits activation of type 1 helper T cells leading to decreased production of interleukin-1 & TNF- α . Interleukin-4 inhibits production of interleukin-6 & interleukin-8.

980 Which of the following is a chemokine ?

British Medical Bulletin 2005;73 & 74:71-82

- A. Interleukin-1
- B. Interleukin-6
- C. Interleukin-8
- D. Interleukin-10

Some cytokines, called chemokines, attract inflammatory cells to travel to the synovial joint. These include interleukin 8 (IL-8) and RANTES.

981 CTLA-4 stands for ?

British Medical Bulletin 2005;73 & 74:71-82

- A. Cytotoxic T-lymphocyte-associated antigen-4
- B. Cytotoxic T-lymphocyte-associated antibody-4
- C. Cytopathic T-lymphocyte-associated antigen-4
- D. Cytopathic T-lymphocyte-associated antibody-4

CTLA-4 stands for Cytotoxic T-lymphocyte-associated antigen-4. It is a co-stimulatory molecule involved in the interaction between T lymphocyte and antigen-presenting cell.

982 **TNF blockade causes deterioration of which of the following inflammatory disease ?**

British Medical Bulletin 2005;73 & 74:71-82

- A. Rheumatoid arthritis
- B. Multiple sclerosis
- C. Ankylosing spondylitis
- D. Psoriasis

TNF blockade causes deterioration of Multiple sclerosis. It is helpful in rheumatoid arthritis, ankylosing spondylitis, psoriasis, Psoriatic arthritis, and Crohn's disease.

983 **Which of the following about RA is false ?**

Harrison's 17th Ed. 2086

- A. Morning stiffness of >1 hour is an invariable feature
- B. Symmetric joint involvement is more typical
- C. Pain originates predominantly from joint capsule
- D. None of the above

984 **In RA, joint swelling results from ?**

Harrison's 17th Ed. 2086

- A. Accumulation of synovial fluid
- B. Hypertrophy of synovium
- C. Thickening of the joint capsule
- D. None of the above

985 **In RA, which of the following joints is rarely involved ?**

Harrison's 17th Ed. 2086

- A. Proximal interphalangeal joints
- B. Distal interphalangeal joints
- C. Metacarpophalangeal joints
- D. Wrist joints

In RA, distal interphalangeal joints are rarely involved.

986 **Baker's cyst is related to which of the following joint ?**

Harrison's 17th Ed. 2086

- A. Elbow joint
- B. Knee joint
- C. Ankle joint
- D. Wrist joint

Baker's cyst is extension of inflamed synovium into popliteal space causing pain & swelling behind knee.

987 **Part of the axial skeleton that is not spared in RA is ?**

Harrison's 17th Ed. 2086

- A. Cervical spine
- B. Thoracic spine
- C. Lumbar spine
- D. Sacral spine

Axial involvement is usually limited to the upper cervical spine.

988 **In RA, which of the following is the characteristic deformity of hand ?**

Harrison's 18th Ed. 2738

- A. "Z" deformity
- B. Swan-neck deformity
- C. Boutonnière deformity

- D. All of the above

Characteristic changes of hand in RA include radial deviation at wrist with ulnar deviation of digits with palmar subluxation of proximal phalanges ("Z" deformity), hyperextension of proximal interphalangeal joints with compensatory flexion of distal interphalangeal joints (swan-neck deformity), flexion contracture of proximal interphalangeal joints & extension of distal interphalangeal joints (Boutonnière deformity), and hyperextension of first interphalangeal joint & flexion of first metacarpophalangeal joint.

989 **Which of the following about extra-articular manifestations of RA is false ?**

Harrison's 17th Ed. 2087

- A. High titers of rheumatoid factor
- B. High titers of antibodies to CCP
- C. Increased mortality
- D. None of the above

Patients of RA with extra-articular manifestations have high titers of autoantibodies to Fc component of IgG (rheumatoid factor) or with antibodies to CCP. RA patients with severe extraarticular manifestations have an increased mortality.

990 **Common location of rheumatoid nodule is ?**

Harrison's 17th Ed. 2087

- A. Olecranon bursa
- B. Achilles tendon
- C. Occiput
- D. All of the above

Common locations of rheumatoid nodule include olecranon bursa, proximal ulna, Achilles tendon, & occiput.

991 **Histologically, central zone of rheumatoid nodules consists of ?**

Harrison's 17th Ed. 2087

- A. Palisading macrophages
- B. Necrotic material
- C. Granulation tissue
- D. Calcified tissue

Histologically, rheumatoid nodules (focal vasculitis) consist of a central zone of necrotic material, a midzone of palisading macrophages and an outer zone of granulation tissue.

992 **Treatment with which of the following can increase the number of rheumatoid nodules dramatically ?**

Harrison's 17th Ed. 2087

- A. Aspirin
- B. Chloroquine
- C. Methotrexate
- D. Penicillamine

In some patients, treatment with methotrexate can increase the number of nodules dramatically.

993 **RA tends to spare which of the following systems ?**

Harrison's 17th Ed. 2087

- A. Central nervous system
- B. Peripheral nervous system
- C. Cardiovascular system
- D. Renal

RA tends to spare central nervous system directly. Renal vasculitis is rare.

994 **Scleromalacia perforans is related to involvement of which of the following organ in RA ?**

Harrison's 17th Ed. 2087

- A. Bone
- B. Cartilage

- C. Tendon
- D. Eye

Thinning & perforation of globe due to scleritis which involves deeper layers of eye is termed as scleromalacia perforans.

995 Felty's syndrome consists of all except ?

Harrison's 17th Ed. 2087

- A. Chronic rheumatoid arthritis
- B. Splenomegaly
- C. Neutropenia
- D. Lymphadenopathy

Felty's syndrome consists of chronic RA, splenomegaly, neutropenia, anemia & thrombocytopenia.

996 RA is associated with an increased incidence of ?

Harrison's 17th Ed. 2087

- A. Cataract
- B. Lymphoma
- C. Mesothelioma
- D. All of the above

RA is associated with an increased incidence of lymphoma, especially large B cell lymphoma.

997 Rheumatoid factor may be present in all except ?

Harrison's 17th Ed. 2088

- A. Systemic lupus erythematosus
- B. Sjogren's syndrome
- C. Wegeners granulomatosis
- D. Sarcoidosis

998 Rheumatoid factor may be present in all except ?

Harrison's 17th Ed. 2088

- A. Interstitial pulmonary fibrosis
- B. Infectious mononucleosis
- C. Hepatitis C
- D. Hepatitis B

999 Rheumatoid factor may be present in all except ?

Harrison's 17th Ed. 2088

- A. Tuberculosis
- B. Leprosy
- C. Syphilis
- D. HIV/AIDS

1000 Rheumatoid factor may be present in all except ?

Harrison's 17th Ed. 2088

- A. Subacute bacterial endocarditis
- B. Visceral leishmaniasis
- C. Trypanosomiasis
- D. Malaria

Besides RA rheumatoid factor may be found in SLE, Sjögren's syndrome, chronic liver disease, sarcoidosis, interstitial pulmonary fibrosis, infectious mononucleosis, hepatitis B, tuberculosis, leprosy, syphilis, SAGE, visceral leishmaniasis, schistosomiasis and malaria.

1001 Additional autoantibodies found in RA are all except ?

Harrison's 16th Ed. 1972

- A. Antibodies to filaggrin

- B. Antibodies to citrullinated proteins
- C. Antibodies to calpastatin
- D. Antibodies to fibronectin

1002 Severe systemic RA disease is reflected by ?

Harrison's 17th Ed. 2088

- A. PMN leucocytosis
- B. Eosinophilia
- C. Basophilia
- D. Thrombocytosis

Eosinophilia, when present, reflects severe systemic RA disease.

1003 Acute-phase reactants elevated in RA include ?

Harrison's 17th Ed. 2088

- A. Erythrocyte sedimentation rate
- B. Ceruloplasmin
- C. C-reactive protein
- D. All of the above

Acute-phase reactants like ESR, ceruloplasmin and C-reactive protein are elevated in RA and correlate well with disease activity and the likelihood of progressive joint damage.

1004 Which of the following is the earliest radiological sign in RA ?

Harrison's 16th Ed. 1973

- A. Soft tissue swelling
- B. Juxta-articular osteopenia
- C. Loss of articular cartilage
- D. Bone erosions

1005 Which of the following is the earliest radiological sign in RA ?

Harrison's 16th Ed. 1973

- A. Formation of spicules
- B. Juxta-articular osteopenia
- C. Joint effusion
- D. Loose bodies

1006 Features that correlate with a greater likelihood of developing joint abnormalities/disabilities in RA include all except ?

Harrison's 17th Ed. 2088

- A. Presence of more than 10 inflamed joints
- B. Markedly elevated erythrocyte sedimentation rate
- C. Radiographic evidence of bone erosions
- D. Presence of rheumatoid nodules

1007 Features that correlate with a greater likelihood of developing joint abnormalities or disabilities in RA include all except ?

Harrison's 17th Ed. 2088

- A. High titers of serum rheumatoid factor
- B. Early age at onset
- C. Low socioeconomic status or education level
- D. Presence of HLA-DRB1*0401 or DRB*0404

*Features that are correlated with a greater likelihood of developing joint abnormalities or disabilities in RA are the presence of >20 inflamed joints, markedly elevated ESR, radiographic evidence of bone erosions, presence of rheumatoid nodules, high titers of serum rheumatoid factor or anti-CCP antibodies, presence of functional disability, persistent inflammation, advanced age at onset, presence of comorbid conditions, low socioeconomic status / educational level, or presence of HLA-DRB1*0401 or -DRB*0404.*

1008 Which of the following does not signify poor prognosis in RA ?

Harrison's 17th Ed. 2088

- A. High titers of rheumatoid factor
- B. High titers of C-reactive protein
- C. High titers of haptoglobin
- D. High titers of histatin

1009 Features of patients with RA that have poor prognostic significance are all except ?

Harrison's 17th Ed. 2088

- A. High titers of rheumatoid factor, CRP & haptoglobin
- B. Subcutaneous nodules
- C. Radiographic evidence of erosions at time of initial evaluation
- D. Sustained disease activity of > 6 months duration

RA patients with high titers of rheumatoid factor, anti-CCP (cyclic citrullinated peptide) antibodies, CRP & haptoglobin have a worse prognosis, as do patients with subcutaneous nodules or radiographic evidence of erosions at the time of initial evaluation. Sustained disease activity of >1 year's duration has a poor outcome.

1010 Factors correlated with early death in RA include ?

Harrison's 17th Ed. 2088

- A. Disability
- B. Age at onset
- C. Glucocorticoid use
- D. All of the above

Factors correlated with early death include disability, disease duration or severity, persistent inflammation, glucocorticoid use, age at onset, and low socioeconomic or educational status.

1011 Median life expectancy of RA patients is shortened by ?

Harrison's 17th Ed. 2088

- A. Nil
- B. 1 - 3 years
- C. 3 - 7 years
- D. 7 - 10 years

The median life expectancy of persons with RA is shortened by 3 - 7 years.

1012 Which of the following statements about RA is false ?

Harrison's 17th Ed. 2088

- A. Foot joints more frequently affected than hand joints
- B. Bilateral symmetric inflammatory polyarthritis
- C. Involves small & large joints in upper & lower limbs
- D. None of the above

1013 Which of the following about RA is false ?

Harrison's 17th Ed. 2088

- A. Sparing of axial skeleton except cervical spine
- B. Morning stiffness lasting > 1 hour
- C. Presence of subcutaneous nodules is diagnostic
- D. None of the above

1014 Which of the following about RA is false ?

Harrison's 17th Ed. 2088

- A. Presence of rheumatoid factor & anti-CCP antibodies
- B. Inflammatory synovial fluid with increased PMNLs
- C. Juxtaarticular bone demineralization
- D. None of the above

1015 Molecular mimicry between microbial proteins & host tissues has been reported in ?

Harrison's 17th Ed. 2071

- A. Type 1 diabetes mellitus
- B. Rheumatoid arthritis
- C. Multiple sclerosis
- D. All of the above

Molecular mimicry between microbial proteins and host tissues has been reported in type 1 diabetes mellitus, rheumatoid arthritis, and multiple sclerosis.

1016 Patients with rheumatoid arthritis have the highest incidence of infective arthritis most often with ?

Harrison's 17th Ed. 2170

- A. *S. aureus*
- B. Streptococci
- C. Hemophilus
- D. Pseudomonas

*Patients with RA have highest incidence of infective arthritis - most often *S. aureus*, because of chronically inflamed joints, glucocorticoid therapy & frequent breakdown of rheumatoid nodules, vasculitic ulcers.*

1017 Distal interphalangeal joints are involved in ?

Harrison's 17th Ed. 2153

- A. Osteoarthritis
- B. Psoriatic
- C. Reactive
- D. All of the above

1018 Most common disorder associated with relapsing polychondritis is ?

Harrison's 17th Ed. 2133

- A. Systemic vasculitis
- B. Rheumatoid arthritis
- C. Systemic lupus erythematosus
- D. Sjögren's syndrome

Most common disorder associated with relapsing polychondritis is Systemic vasculitis.

1019 Upper airway obstruction in RA is due to ?

Harrison's 17th Ed. 1649

- A. Cervical spine involvement
- B. Muscular atrophy
- C. Crico-arytenoid arthritis
- D. All of the above

Upper airway obstruction in RA is due to Crico-arytenoid arthritis.

1020 In RA, exudative pericardial fluid has ?

Harrison's 17th Ed. 1500

- A. Decreased concentrations of complement
- B. Decreased concentrations of glucose
- C. Elevated cholesterol
- D. All of the above

1021 Which of the following is true about Rheumatoid factor ?

Cleveland Clinic J of Med 2012;79(4):249

- A. Antibody against Fc portion of immunoglobulin A
- B. Antibody against Fc portion of immunoglobulin E

- C. Antibody against Fc portion of immunoglobulin G
- D. All of the above

Rheumatoid factor, first described in 1940, is an antibody against Fc portion of immunoglobulin G.

1022 Rheumatoid factor can be detected in ?

Cleveland Clinic J of Med 2012;79(4):249

- A. Malaria
- B. Tuberculosis
- C. Hepatitis C
- D. All of the above

1023 Rheumatoid factor can be detected in ?

Cleveland Clinic J of Med 2012;79(4):249

- A. Bacterial endocarditis
- B. SjÖgren syndrome
- C. Systemic lupus erythematosus
- D. All of the above

Rheumatoid factor testing suffers from low specificity, since it can be detected in bacterial endocarditis, malaria, tuberculosis, osteomyelitis, hepatitis C (with or without cryoglobulinemia), SjÖgren syndrome, systemic lupus erythematosus, primary biliary cirrhosis, postvaccination arthropathy, and aging.

1024 Citrulline is generated in an inflammatory environment by the modification of which amino acid ?

Cleveland Clinic J of Med 2012;79(4):249

- A. Arginine
- B. Lysine
- C. Isoleusine
- D. Tryptophan

RA patients often produce autoantibodies directed against proteins and peptides containing amino acid citrulline. Citrulline is generated in an inflammatory environment by the modification of the amino acid arginine by the enzyme peptidylarginine deiminase.

1025 Which of the following about Anti-CCP antibody is false ?

Cleveland Clinic J of Med 2012;79(4):249

- A. Found in sera years before the onset of joint symptoms
- B. Appear earlier than rheumatoid factor
- C. Does not vary with the activity of RA
- D. None of the above

Anti-CCP antibody has been found in sera up to 10 years before the onset of joint symptoms in patients who later develop RA and may appear earlier than rheumatoid factor. Rheumatoid factor positivity and anti-CCP antibody positivity are each associated with more severe RA. Neither test varies with the activity of RA. Higher anti-CCP antibody titer was associated with increased disease activity and inversely correlated with remission, especially in those also positive for rheumatoid factor.

1026 Disease-Modifying Antirheumatic Drugs (DMARDs) in RA include all except ?

Harrison's 17th Ed. 2090

- A. Methotrexate
- B. Gold compounds
- C. D-penicillamine
- D. Azathioprine

DMARDs include methotrexate, sulfasalazine, hydroxychloroquine, gold salts, or D-penicillamine. Combinations of DMARDs appear to be more effective than single agents in controlling the signs and symptoms of RA.

1027 Out of the following Disease-Modifying Antirheumatic Drugs in RA, most rheumatologists use which one as the first drug ?

Harrison's 16th Ed. 1975

- A. Methotrexate
- B. Gold compounds
- C. D-penicillamine
- D. Sulfasalazine

Methotrexate has emerged as the DMARD of choice especially in individuals with risk factors for development of bone erosions or persistent synovitis of >3 months' duration.

1028 Maximal improvement is observed after how many months of methotrexate therapy ?

Harrison's 17th Ed. 2090

- A. 1
- B. 2
- C. 3
- D. 6

Maximal improvement is observed after six months of methotrexate therapy, with little additional improvement thereafter.

1029 Concurrent administration of which of the following may diminish the frequency of some side effects of methotrexate ?

Harrison's 17th Ed. 2090

- A. Pyridoxine
- B. Omega 3 fatty acids
- C. Folic acid or folinic acid
- D. Iron

Methotrexate is an antimetabolite & antifolate drug. Concurrent administration of folic acid or folinic acid diminishes frequency of its side effects.

1030 Which of the following is false about Leflunomide ?

Harrison's 17th Ed. 2090, N Engl J Med 2004;350:2167-79

- A. An oral antimetabolite
- B. It is a pro-drug
- C. Competitive inhibitor of dihydro-orotate dehydrogenase
- D. Leflunomide is safe in pregnancy

Leflunomide is an oral antimetabolite pro-drug which inhibits dihydro-orotate dehydrogenase, the rate limiting enzyme for de novo synthesis of pyrimidine nucleotides. Leflunomide is teratogenic. Its active metabolite is A77 1726.

1031 Which of the following is false about Leflunomide ?

Harrison's 17th Ed. 2090, N Engl J Med 2004;350:2167-79

- A. Blocks pyrimidine-synthesis pathway
- B. Causes hypertension
- C. Hepatic adverse effects
- D. Usual daily dose is 200 mg.

Usual daily dose is 20 mg.

1032 Which of the following is a TNF-neutralizing agent ?

Harrison's 17th Ed. 2090

- A. Infliximab
- B. Etanercept
- C. Adalimumab
- D. All of the above

TNF-neutralizing agents include infliximab, etanercept and adalimumab.

1033 Which of the following is a IL-1-neutralizing agent ?

Harrison's 17th Ed. 2090

- A. Infliximab
- B. Etanercept
- C. Adalimumab
- D. Anakinra

IL-beta and IL-1alpha are two related proinflammatory cytokines. Anakinra is a recombinant IL-1 receptor antagonist that binds to the cell-bound IL-1 receptor and inhibits the binding of endogenous IL-1. It has been used effectively to treat adult Still's disease and Muckle-Wells syndrome.

1034 Which of the following is a hereditary febrile syndrome ?

Harrison's 17th Ed. Chapter 323

- A. Familial cold autoinflammatory syndrome (FCAS)
- B. Muckle-Wells syndrome (MWS)
- C. Neonatal-onset multisystem inflammatory disease (NOMID)
- D. All of the above

Familial cold autoinflammatory syndrome (FCAS), Muckle-Wells syndrome (MWS), and neonatal-onset multisystem inflammatory disease (NOMID) are hereditary febrile syndromes caused by mutations in CIAS1, the gene encoding cryopyrin (or NALP3). Features of MWS are urticarial rash, fevers, abdominal pain, limb pain, arthritis, conjunctivitis and sensorineural hearing loss. Cryopyrin regulates IL-1 production through the formation of a macromolecular complex termed the inflammasome. Patients with all three cryopyrinopathies show a dramatic response to daily injections of anakinra, the IL-1 receptor antagonist.

1035 Which of the following about Anakinra is false ?

Harrison's 17th Ed. 2090

- A. Can be given as monotherapy or with methotrexate
- B. Less effective than Anti-TNF therapy
- C. Should not be combined with Anti-TNF therapy
- D. None of the above

1036 Rituximab acts by ?

Harrison's 17th Ed. 2090

- A. TNF-neutralizing action
- B. IL-1-neutralizing action
- C. Interfering with T cell activation
- D. Depleting B cells

Rituximab is a chimeric antibody directed against the B-lymphocyte cell surface marker CD20 (CD20 is not present on all plasma cells or on very early B cells). Given to RA patients who have failed anti-TNF therapy. It can be combined with methotrexate. Its therapy can be repeated at 6-month intervals when circulating B cells return.

1037 Abatacept acts by ?

Harrison's 17th Ed. 2090

- A. TNF-neutralizing action
- B. IL-1-neutralizing action
- C. Interfering with T cell activation
- D. Depleting B cells

Abatacept is a fusion protein consisting of CTLA4 (cytotoxic T-lymphocyte-associated antigen-4) and the Fc portion of IgG1. It inhibits T cell activation by competitively inhibiting co-stimulation of T cells that results from interaction of T cell - expressed CD28 & CD80/86 expressed by antigen-presenting cells. It is reserved for patients who have failed Anti-TNF therapy or those who have contraindications to Anti-TNF therapy.

1038 Immunosuppressive and cytotoxic drug used in RA is ?

Harrison's 17th Ed. 2090

- A. Leflunomide
- B. Cyclosporine
- C. Azathioprine
- D. All of the above

Immunosuppressive and cytotoxic drugs used in RA are leflunomide, cyclosporine, azathioprine and cyclophosphamide.

1039 Which of the following is a fully human antibody to TNF ?

Harrison's 17th Ed. 2090

- A. Infliximab
- B. Etanercept
- C. Adalimumab
- D. None of the above

Etanercept is a fusion protein consisting of two p75 TNF receptors linked to Fc portion of human IgG1, infliximab is a chimeric mouse/human monoclonal antibody to TNF, and adalimumab is a fully human antibody to TNF with no rodent components..

1040 Which of the following drug regimens provides greatest benefit in RA ?

Harrison's 17th Ed. 2090

- A. TNF-neutralizing agent alone
- B. TNF-neutralizing agent + methotrexate
- C. TNF-neutralizing agent + methotrexate + DMARD
- D. Any of the above

1041 Anti-TNF therapy can lead to ?

Harrison's 17th Ed. 2090

- A. Reactivation of dormant tuberculosis
- B. Increased risk of lymphoma
- C. Development of demyelinating CNS disease
- D. All of the above

TNF blocking therapies is associated with reactivation of latent Mycobacterium tuberculosis and risk of other infections, induction of autoantibodies (ANAs anti dsDNA) and autoimmune diseases (SLE), worsening of severe heart failure, demyelinating CNS disease and increased risk of lymphomas (more with infliximab).

1042 Which of the following is administered subcutaneously ?

Harrison's 17th Ed. 2090

- A. Adalimumab
- B. Etanercept
- C. Anakinra
- D. All of the above

Infliximab and Rituximab are given IV.

1043 Infliximab was originally called ?

British Medical Bulletin 2005;73 & 74:71-82

- A. CA1
- B. CA2
- C. CA3
- D. CA4

Infliximab was originally called CA2.

1044 HACA stands for ?

British Medical Bulletin 2005;73 & 74:71-82

- A. Human anti-cytoplasmic antibodies
- B. Human anti-cytoskeleton antibodies
- C. Human anti-chimaeric antibodies
- D. Human anti-conjugation antibodies

During infliximab therapy, antibodies against it are produced. These human anti-chimaeric antibodies (HACA) result in reduction of its efficacy. Use of methotrexate with infliximab reduced this antibody production.

Rabies

1045 World Rabies Day is on ?

- A. August 05
- B. September 07
- C. October 11
- D. November 12

1046 In Greek, word “lyssa” means ?

WHO Technical Report Series 931

- A. Rabies
- B. Bullet
- C. Animal
- D. Death

In Greek, lyssa means rabies.

1047 Rabies is a disease of ?

Harrison’s 18th Ed. 1611

- A. Autonomic nervous system
- B. Peripheral nervous system
- C. Central nervous system
- D. All of the above

Rabies is an acute viral disease of the central nervous system (CNS)

1048 Rabies manifests most often as ?

Harrison’s 18th Ed. 1611

- A. Meningitis
- B. Encephalitis
- C. Peripheral neuritis
- D. All of the above

Rabies manifests most often as encephalitis.

1049 Rabies virus belongs to which family of viruses ?

Harrison’s 18th Ed. 1611

- A. Coronaviridae
- B. Flaviviridae
- C. Rhabdoviridae
- D. Arenaviridae

Rhabdos means “rodlike”. Rabies virus belongs to the order Mononegavirales, viruses with a nonsegmented, negative-stranded RNA genomes. Within this group, viruses with a distinct “bullet” shape are classified in the Rhabdoviridae family, which includes three genera of animal viruses, Lyssavirus, Ephemerovirus and Vesiculovirus. Genus Lyssavirus includes rabies virus, Lagos bat, Mokola virus, Duvenhage virus, European bat virus 1 & 2 and Australian bat virus.

1050 Which of the following is not a characteristic of rabies virus ?

Harrison’s 18th Ed. 1611

- A. Bullet shaped
- B. Enveloped
- C. Single-strand RNA
- D. Positive polarity

Rabies virus is bullet shaped, enveloped, single-strand RNA virus of negative polarity. The first step in viral replication is synthesis of full-length copies (postive strands) of the viral genome.

1051 Rabies virus genome encodes which of the follwoing proteins ?

Harrison’s 18th Ed. 1611

- A. Nucleoprotein
- B. Matrix protein
- C. Glycoprotein
- D. All of the above

Rabies is an RNA virus. Rabies virus genome consists of 11,932 nucleotides and encodes five proteins - nucleocapsid (N), matrix protein (M), glycoprotein (G), phosphoprotein (P) and a large RNA polymerase protein (L).

1052 Rabies virus variants can be distinguished by the sequence of ?

Harrison’s 18th Ed. 1611

- A. Nucleocapsid gene
- B. Matrix protein gene
- C. Glycoprotein gene
- D. Polymerase protein gene

Each animal reservoir harbors one or more distinct rabies virus variants that can be distinguished by the sequence of the nucleocapsid gene.

1053 Rabies is not found in mammals in which of the following regions of the world ?

Harrison’s 18th Ed. 1611

- A. Arctic
- B. Antarctica
- C. Tasmania
- D. Newzealand

Rabies is found in mammals in all regions of the world except Antarctica.

1054 Sylvatic rabies is propagated by ?

Harrison’s 16th Ed. 1156

- A. Foxes
- B. Wolves
- C. Bats
- D. All of the above

Sylvatic rabies is propagated by skunks, foxes, raccoons, mongooses, wolves, and bats.

1055 The main reservoir of rabies throughout the world is ?

Harrison’s 18th Ed. 1611

- A. Domestic dog
- B. Bats
- C. Cats
- D. Wolves

The main reservoir of rabies throughout the world is the domestic dog.

1056 In United States, the domestic animal most commonly infected with rabies is ?

Harrison’s 18th Ed. 1611

- A. Domestic dog
- B. Bat
- C. Cat
- D. Wolve

In the United States, the domestic animal most commonly infected with rabies is the cat.

1057 Which particular bat-associated rabies virus is implicated in most human cases ?

Harrison's 16th Ed. 1156

- A. Kn/Ps
- B. Ln/Ps
- C. Mn/Ps
- D. nn/Ps

It is observed that a particular bat-associated rabies virus is implicated in most human cases - Ln/ Ps (Lasionycteris noctivagans), which is associated with silver-haired and eastern pipistrelle bats.

1058 Upon inoculation of skin by rabies virus-laden saliva, initial viral replication occurs in ?

Harrison's 16th Ed. 1157

- A. Epidermal cells of skin
- B. Dorsal spinal ganglia
- C. Cortical gray matter
- D. Striated muscle cells

After inoculation of rabies virus through skin, initial viral replication occurs within striated muscle cells at the site of inoculation.

1059 Which neurotransmitter receptors is implicated in rabies virus attachment and internalization ?

Harrison's 18th Ed. 1612

- A. Acetylcholine
- B. Norepinephrine
- C. Serotonin
- D. Dopamine

Rabies virus binds to nicotinic acetylcholine receptors at neuromuscular junctions, and acetylcholine receptor blockade inhibits rabies virus attachment. Neural cell adhesion molecule and p75^{NTR} neurotrophin receptor may be receptors for rabies virus.

1060 The incubation period of rabies is ?

Harrison's 18th Ed. 1612

- A. 20 days to >1 year
- B. 21 days to >1 year
- C. 60 days to >1 year
- D. 90 days to >1 year

Incubation period of rabies is exceedingly variable, from 20 days to 90 days but may be >1 year.

1061 Rabies virus spreads centripetally to CNS at a rate of ?

Harrison's 18th Ed. 1612

- A. 1 - 50 mm/day
- B. 50 - 150 mm/day
- C. 100 - 400 mm/day
- D. 400 - 700 mm/day

After entering sensory and motor neurons, rabies virus spreads centripetally at a rate of 100 - 400 mm/day or ~250 mm/day via fast axonal transport to the spinal cord or brainstem.

1062 In CNS, rabies virus replicates almost exclusively within ?

Harrison's 16th Ed. 1157

- A. Gray matter
- B. White matter
- C. CSF
- D. Venous sinuses

In CNS, rabies virus replicates almost exclusively within the gray matter.

1063 Which of the following is least evident in the gray matter infected by the rabies virus ?

Harrison's 18th Ed. 1612

- A. Inflammatory changes
- B. Degenerative changes
- C. Neuronal death
- D. All of the above

Once the virus enters the CNS, it spreads rapidly throughout the gray matter via established neuroanatomic connections. There are inflammatory changes, but there are few degenerative changes involving neurons and little evidence of neuronal death.

1064 From CNS, rabies virus passes centrifugally to other tissues via ?

Harrison's 18th Ed. 1612

- A. Blood
- B. Skin
- C. Autonomic nerves
- D. Motor nerves

From CNS, rabies virus passes centrifugally along sensory and autonomic nerves to other tissues like salivary glands, adrenal medulla, kidneys, lungs, liver, skeletal muscles, skin, and heart.

1065 Rates of infection & mortality from rabies are highest from bites on ?

Harrison's 16th Ed. 1157

- A. Hands and arms
- B. Legs
- C. Face
- D. Abdomen

Rates of infection and mortality from rabies are highest from bites on face, intermediate from bites on hands & arms and lowest from bites on legs.

1066 Eosinophilic cytoplasmic inclusions within neurons of CNS in rabies are called ?

Harrison's 18th Ed. 1612

- A. Bunina bodies
- B. Nissel bodies
- C. Negri bodies
- D. Lewy bodies

The most characteristic pathologic finding of rabies in CNS is the formation of eosinophilic cytoplasmic inclusions called Negri bodies within neurons.

1067 In brain, Negri bodies are found in ?

Harrison's 18th Ed. 1612

- A. Ammon's horn
- B. Hypothalamus
- C. Purkinje cells of cerebellum
- D. All of the above

Negri bodies are most commonly present in Purkinje cells of cerebellum and in pyramidal cells in hippocampus, and less frequently seen in cortical neurons and in brainstem. In 1903, Dr. Adelchi Negri reported round or oval inclusions within cytoplasm of nerve cells of animals infected with rabies. Negri bodies can also be found in neurons of salivary glands or tongue.

1068 Which of the following about Negri bodies is false ?

Harrison's 18th Ed. 1612

- A. Absence of Negri bodies excludes rabies
- B. Negri bodies are cytoplasmic inclusions
- C. Rare in infections due to laboratory variants of rabies virus

D. Represent nucleocapsids of rabies virus

Absence of Negri bodies does not exclude the diagnosis of rabies.

1069

Babes nodules are best related to ?

Harrison's 18th Ed. 1612

A. Apoptotic neurons

B. Vanishing nodules

C. Microglial nodules

D. Degenerative neurons

Pathology studies show mild inflammatory changes in the CNS in rabies, with mononuclear inflammatory infiltration in the leptomeninges, perivascular regions, and parenchyma, including microglial nodules called Babes nodules.

1070

Phases of clinical rabies are all except ?

Harrison's 18th Ed. 1614 Table 195-1

A. Prodrome

B. Acute neurologic phase

C. Chronic neurologic phase

D. Coma/death

Clinical rabies has three general phases - prodrome, acute neurologic phase (Encephalitic and paralytic) and coma/death.

1071

Prodromal symptom suggestive of rabies is ?

Harrison's 18th Ed. 1612

A. Oozing of blood at the site of inoculation

B. Vesicles at the site of inoculation

C. Paresthesia / fasciculations at the site of inoculation

D. Gangrene at the site of inoculation

Prodromal period usually lasts 2 to 10 days. The prodromal symptom suggestive of rabies is the complaint of paresthesia and/or fasciculations at or around the site of inoculation of virus - reported by 50 to 80% of patients.

1072

Hydrophobia or aerophobia in encephalitic rabies is due to involvement of neurons in ?

Harrison's 18th Ed. 1613

A. Cortex

B. Purkinje cells of cerebellum

C. Pyramidal cells in hippocampus

D. Brainstem

Rabies encephalitis results in early brainstem involvement. Hydrophobia or aerophobia are probably due to dysfunction of infected brainstem neurons that normally inhibit inspiratory neurons near nucleus ambiguus resulting in exaggerated defense reflexes that protect the respiratory tract.

1073

Paralytic presentation during acute neurologic phase of rabies is seen in what percentage of cases ?

Harrison's 18th Ed. 1614

A. 5 %

B. 20 %

C. 40 %

D. 60 %

Two acute neurologic forms of rabies seen in humans are encephalitic (furious) in 80% & paralytic in 20%.

1074

Features of rapidly progressive encephalitis and prominent brainstem signs is suggestive of ?

Harrison's 16th Ed. 2482

A. Flaviviruses (WNV, Japanese encephalitis virus)

B. HSV

C. Rabies

D. All of the above

Patients with rapidly progressive encephalitis and prominent brainstem signs, symptoms or neuroimaging abnormalities may be infected by flaviviruses (WNV, Japanese encephalitis virus), HSV, rabies or L. monocytogenes.

1075

Hydrophobia is due to painful, violent and involuntary contraction of which of the following muscles ?

Harrison's 18th Ed. 1613

A. Diaphragmatic

B. Pharyngeal

C. Laryngeal

D. All of the above

Hydrophobia - the painful, violent, involuntary contraction of the diaphragmatic, accessory respiratory, pharyngeal, and laryngeal muscles initiated by swallowing liquids is seen in ~50% of cases of rabies.

1076

“Dumb rabies” is similar in presentation to ?

Harrison's 16th Ed. 1157

A. Multiple sclerosis

B. Amotrophic lateral sclerosis

C. Landry Guillain-Barre´ syndrome

D. Amaurosis fugax

Rabies may present as an ascending paralysis resembling the Landry Guillain-Barre´ syndrome (dumb rabies or rage tranquille).

1077

Paralytic rabies is characterized by ?

Harrison's 18th Ed. 1614

A. Early and prominent muscle weakness

B. Facial weakness

C. Sphincter involvement

D. All of the above

Paralytic rabies is characterized by early and prominent muscle weakness, often beginning in the bitten extremity and spreading to produce quadriparesis and facial weakness. Sphincter involvement is common, but sensory involvement is usually mild.

1078

In rabies, without artificial supportive measures, maximum period of survival after onset of symptoms is ?

Harrison's 16th Ed. 1157

A. 10 days

B. 20 days

C. 30 days

D. 40 days

The median period of survival after the onset of symptoms is 4 days, with a maximum of 20 days, unless artificial supportive measures are instituted.

1079

Which of the following is not a presentation of rabies ?

Harrison's 16th Ed. 1157

A. Autonomic nervous system dysfunction

B. Lower motor neuron paralysis

C. Cranial nerve palsies

D. Priapism and spontaneous ejaculation

Evidence of upper motor neuron paralysis, with weakness, increased deep tendon reflexes, and extensor plantar responses, is the rule.

1080

Full-thickness skin biopsy sample for the antemortem diagnosis of rabies is obtained from ?

Harrison's 18th Ed. 1615

- A. Nape of the neck
- B. Site of inoculation
- C. Scalp
- D. Ear lobule

Full-thickness skin biopsy sample from nape of the neck with at least 10 hair follicles is taken for diagnosis of rabies.

1081 Which of the following is the most sensitive test for demonstrating rabies virus specific antigen/antibody ?

Harrison's 18th Ed. 1615

- A. Indirect fluorescent antibody test
- B. Rapid fluorescent focus inhibition test (RFFIT)
- C. Reverse transcription polymerase chain reaction (RT-PCR)
- D. Direct fluorescent antibody (DFA) test

With the exquisitely sensitive RT-PCR, the presence of rabies virus nucleic acid in fresh saliva can be confirmed or ruled out.

1082 Which of the following does not constitute an exposure to rabies ?

Harrison's 16th Ed. 1158

- A. Touching a rabid animal or person
- B. Contamination of mucous membranes with infectious material
- C. Infectious aerosol of rabies virus
- D. Ocular contact with contaminated material

Simply touching a rabid animal or person does not constitute an exposure to rabies.

1083 Rabies postexposure prophylaxis (PEP) includes ?

Harrison's 18th Ed. 1616

- A. Local wound care
- B. Active immunization
- C. Passive immunization
- D. All of the above

Rabies PEP includes local wound care, active & passive immunization.

1084 Rabies immune globulin (RIG) should not be administered how many days after the first vaccine dose ?

Harrison's 18th Ed. 1616

- A. 1 day
- B. 3 days
- C. 5 days
- D. 7 days

All previously unvaccinated persons should be passively immunized with rabies immune globulin (RIG). RIG should not be administered 7 days after the first vaccine dose as endogenous antibodies are produced and passive immunization may be counterproductive.

1085 Dose of Rabies immune globulin (RIG) is ?

Harrison's 18th Ed. 1616

- A. 5 IU/kg
- B. 10 IU/kg
- C. 20 IU/kg
- D. 40 IU/kg

Dose of RIG is 20 IU/kg and should be injected at site of bite and any remaining after infiltration of the bite site should be administered intramuscularly at a distant site.

1086 RIG is derived from ?

Harrison's 18th Ed. 1616

- A. Cow

- B. Dog
- C. Sheep
- D. Human

RIG is purified from serum of hyperimmunized human donors (HRIG) and are better tolerated than equine-derived preparations (ERIG dose 40 IU/kg).

1087 After immunization, serum neutralizing antibody titers become detectable within ?

Harrison's 18th Ed. 1616

- A. 1 - 2 weeks
- B. 2 - 4 weeks
- C. 4 - 6 weeks
- D. 6 - 8 weeks

After immunization, serum neutralizing antibody titers become detectable within 2 - 4 weeks.

1088 Human rabies postexposure prophylaxis (PEP) consists of five doses of purified inactivated rabies vaccine given on days ?

Harrison's 18th Ed. 1616

- A. 0, 3, 7, 14 and 28
- B. 0, 3, 7, 14 and 90
- C. 0, 7, 14, 21 and 28
- D. 0, 7, 14, 21 and 90

1-mL doses of purified inactivated rabies vaccine are given on 0, 3, 7, 14, and 28 days.

1089 For adults, which is the preferred site for HDCV, RVA, or PCEC injections ?

Harrison's 18th Ed. 1616

- A. Deltoid
- B. Abdomen
- C. Gluteal
- D. Thigh

The gluteal area should never be used for Human Diploid Cell Vaccine (HDCV), Rabies Vaccine Adsorbed (RVA), or Purified Chick Embryo Cell Vaccine (PCEC) injections because administration of HDCV in this area results in lower neutralizing antibody titers. Administration in anterolateral aspect of thigh is acceptable in children.

1090 According to Advisory Committee on Immunization Practices (ACIP), schedule of preexposure rabies vaccination is ?

Harrison's 18th Ed. 1616

- A. Days 0, 3, and 21 or 28
- B. Days 0, 3, and 90
- C. Days 0, 7, and 21 or 28
- D. Days 0, 7, and 90

ACIP recommends preexposure rabies vaccination of 1-mL doses of modern cell culture vaccine administered intramuscularly on days 0, 7, and 21 or 28. When a previously immunized individual is exposed to rabies, two booster doses of vaccine should be administered on days 0 and 3. RIG should not be administered to previously vaccinated persons.

1091 Pasteur vaccine was made out of ?

- A. Horse spinal cords
- B. Rabbit spinal cords
- C. Mouse spinal cords
- D. Cow spinal cords

Pasteur vaccine was made out of rabbit spinal cords.

1092 Semple vaccine is best related to ?

- A. Coonoor

- B. Kasauli
- C. Chennai
- D. Mumbai

Semple vaccine is named after Dr David Semple, British director of Central Research institute (CRI) at Kasauli in 1911.

1093 Semple vaccine is manufactured from ?

- A. Brains of adult sheep
- B. Brains of adult horse
- C. Brains of adult cow
- D. Brains of adult mouse

Semple vaccine is manufactured from brains of adult sheep.

1094 Shelf life of Semple vaccine is ?

- A. Three months
- B. Six months
- C. Nine months
- D. Twelve months

Shelf life of Semple vaccine is six months.

Skin manifestations in medical disorders

1095 Which of the following is a papulosquamous disease ?

Harrison's 16th Ed. 296

- A. Psoriasis
- B. Tinea
- C. Pityriasis rosea
- D. All of the above

1096 Which of the following is known to exacerbate psoriasis ?

Harrison's 16th Ed. 296

- A. Lithium
- B. Beta blockers
- C. HIV infection
- D. All of the above

1097 Pityriasis rosea like drug eruptions are seen with all except ?

Harrison's 16th Ed. 296

- A. Beta blockers
- B. ACE inhibitors
- C. Thiazides
- D. Metronidazole

1098 Lichenoid eruptions are seen with all except ?

Harrison's 16th Ed. 296

- A. Sulfonyleureas
- B. ACE inhibitors
- C. Thiazides
- D. Metronidazole

1099 Which of the following is false about secondary syphilis ?

Harrison's 16th Ed. 296

- A. Red-brown papules
- B. Involves palms & soles

- C. Nonscarring alopecia
- D. None of the above

1100 Which of the following is a cause of nonscarring alopecia ?

Harrison's 16th Ed. 298

- A. Hypothyroidism
- B. Hyperthyroidism
- C. Hypopituitarism
- D. All of the above

1101 Which of the following is not a cause of nonscarring alopecia ?

Harrison's 16th Ed. 298

- A. Telogen effluvium
- B. Androgenetic alopecia
- C. Lichen planus
- D. Tinea capitis

1102 Erythema marginatum is seen primarily on ?

Harrison's 16th Ed. 298

- A. Face
- B. Trunk
- C. Extremities
- D. All of the above

1103 Which of the following is a feature of 'Poikiloderma' ?

Harrison's 16th Ed. 298

- A. Reticulated hypo- and hyperpigmentation
- B. Wrinkling due to epidermal atrophy
- C. Telangiectasias
- D. All of the above

1104 Poikiloderma is a feature of all except ?

Harrison's 16th Ed. 300

- A. Dermatomyositis
- B. Cutaneous T cell lymphoma
- C. Mastocytosis
- D. Xeroderma pigmentosum

1105 "Mat telangiectasia" is characteristic of ?

Harrison's 16th Ed. 298

- A. Venous hypertension
- B. Scleroderma
- C. Carcinoid syndrome
- D. All of the above

1106 "Mat telangiectasia" are commonly found at all of the following sites except ?

Harrison's 16th Ed. 298

- A. Face
- B. Oral mucosa
- C. Hands
- D. Abdomen

1107 Which of the following is not a cause of "Periungual telangiectasia" ?

Harrison's 16th Ed. 300

- A. Lupus erythematosus

- B. Scleroderma
C. Hereditary hemorrhagic telangiectasia
D. Dermatomyositis
- 1108 "Spider angioma" can be ?**
Harrison's 16th Ed. 300
A. Idiopathic
B. Pregnancy related
C. Cirrhosis liver related
D. All of the above
- 1109 "Papular telangiectasia" is a feature of ?**
Harrison's 16th Ed. 300
A. Hereditary hemorrhagic telangiectasia
B. Carcinoid syndrome
C. Ataxia-telangiectasia
D. Mastocytosis
- 1110 Which of the following diseases is associated with vitiligo ?**
Harrison's 16th Ed. 299
A. Vogt-Koyanagi-Harada syndrome
B. Scleroderma
C. Melanoma-associated leukoderma
D. All of the above
- 1111 Which of the following is not a feature of Waardenburg's syndrome ?**
Harrison's 16th Ed. 300
A. Congenital sensorineural hearing loss
B. Increased interpupillary distance
C. Broad nasal root
D. Piebaldism
- 1112 Which of the following is not a cause of acneiform eruptions ?**
Harrison's 16th Ed. 300
A. Anabolic steroids
B. Lithium
C. Calcium
D. Iodides
- 1113 Which of the following is a cause of hyperpigmentation ?**
Harrison's 16th Ed. 303
A. Vitamin B₁₂ deficiency
B. Folic acid deficiency
C. Pellagra
D. All of the above
- 1114 Which of the following is a cause of hyperpigmentation ?**
Harrison's 16th Ed. 303
A. Porphyria cutanea tarda
B. Hemochromatosis
C. Whipple's disease
D. All of the above
- 1115 Which of the following can cause toxic epidermal necrolysis ?**
Harrison's 16th Ed. 303
- A. Phenytoin
B. Barbiturates
C. Penicillins
D. All of the above
- 1116 Acanthosis nigricans is associated with all except ?**
Harrison's 16th Ed. 302
A. Acromegaly
B. Hypothyroidism
C. Cushing's syndrome
D. Stein-Leventhal syndrome
- 1117 Which of the following is not a part of LEOPARD syndrome ?**
Harrison's 16th Ed. 302
A. Lentigines
B. EEG abnormalities
C. Pulmonary stenosis
D. Deafness (sensorineural)
- 1118 Which of the following is not a part of POEMS syndrome ?**
Harrison's 16th Ed. 303
A. Polyneuropathy
B. Optic neuritis
C. Endocrinopathies
D. M-protein
- 1119 Which of the following drugs does not produce "Diffuse hyperpigmentation" ?**
Harrison's 16th Ed. 303
A. Chlorpromazine
B. Busulfan
C. Chloroquine
D. Cyclophosphamide
- 1120 Erythema multiforme (EM) may be due to ?**
Harrison's 16th Ed. 304
A. Carbamazepine
B. Herpes simplex virus
C. Mycoplasma pneumoniae
D. All of the above
- 1121 Which of the following toxins is associated with Staphylococcal scalded-skin syndrome (SSSS) ?**
Harrison's 16th Ed. 304
A. Aflatoxin B₁
B. Lymphotoxin
C. TSST-1
D. Exfoliatin
- 1122 Gottron's sign is characteristic of ?**
Harrison's 16th Ed. 316
A. Stevens-Johnson syndrome
B. Dermatitis herpetiformis
C. Cicatricial pemphigoid
D. Dermatomyositis

1123 Coronary aneurysm secondary to arteritis in which of the following disease ?

Harrison's 16th Ed. 305

- A. Toxic shock syndrome
- B. Kawasaki's disease
- C. Erythema infectiosum
- D. Rubella

1124 Urticarial lesions can be seen in which of the following diseases ?

Harrison's 16th Ed. 305

- A. Mastocytosis
- B. Hyperthyroidism
- C. Juvenile rheumatoid arthritis
- D. All of the above

1125 Cholinergic urticaria is precipitated by ?

Harrison's 16th Ed. 305

- A. Heat
- B. Exercise
- C. Emotion
- D. All of the above

1126 Which of the following urticarias is typically present in Erythropoietic protoporphyria ?

Harrison's 16th Ed. 305

- A. Solar urticaria
- B. Cold urticaria
- C. Cholinergic urticaria
- D. All of the above

1127 Urticarial vasculitis is a feature of ?

Harrison's 16th Ed. 305

- A. Systemic lupus erythematosus
- B. Sjogren's syndrome
- C. Hepatitis B
- D. All of the above

1128 "Button-hole" sign is typical of ?

Harrison's 16th Ed. 306

- A. Rheumatoid nodules
- B. Angiofibromas
- C. Neurofibromas
- D. Lipomas

1129 Yellow colored cutaneous papules/plaques are seen in ?

Harrison's 16th Ed. 307

- A. Gout (Tophi)
- B. Diabetes (Necrobiosis lipoidica)
- C. Pseudoxanthoma elasticum
- D. All of the above

1130 Increased beta lipoproteins result in which of the following types of xanthoma ?

Harrison's 16th Ed. 307

- A. Xanthelasma
- B. Tendon xanthomas

- C. Plane xanthomas
- D. All of the above

1131 Lesions of necrobiosis lipoidica in diabetes are found on ?

Harrison's 16th Ed. 307

- A. Helix of ear
- B. Olecranon
- C. Prepatellar bursae
- D. Shins

1132 Long-term administration of which of the following drugs can lead to pseudoxanthoma elasticum (PXE) like skin changes ?

Harrison's 16th Ed. 307

- A. Beta blockers
- B. Calcium channel blockers
- C. Chloroquine
- D. D-penicillamine

1133 Patients with Torre syndrome can have carcinomas of ?

Harrison's 16th Ed. 307

- A. Sebaceous carcinoma
- B. Colon carcinoma
- C. Endometrial carcinoma
- D. All of the above

1134 Monoclonal cryoglobulinemia is associated with ?

Harrison's 16th Ed. 307

- A. Multiple myeloma
- B. Waldenstrom's macroglobulinemia
- C. Lymphocytic leukemia
- D. All of the above

1135 What percentage of epidermal detachment defines Toxic epidermal necrolysis (TEN) ?

Harrison's 16th Ed. 321

- A. > 5 %
- B. > 10 %
- C. > 20 %
- D. > 30 %

1136 Which of the following has the highest risk of severe adverse cutaneous reactions ?

Harrison's 16th Ed. 322

- A. Lamotrigine
- B. Phenytoin
- C. Carbamazepine
- D. Phenobarbitone

1137 "Red man syndrome" is caused by ?

Harrison's 16th Ed. 322

- A. Sulfonamides
- B. Lamotrigine
- C. IV Vancomycin
- D. High-osmolality radiocontrast media

1138 Alopecia is a common complication of ?

Harrison's 16th Ed. 322

- A. IFN- α
- B. IFN- β
- C. Granulocyte colony-stimulating factor
- D. IL-2

1139 After initiating drug therapy, fixed drug reactions occur within ?

Harrison's 16th Ed. 322

- A. 2 days
- B. 7 days
- C. 14 days
- D. 21 days

1140 Nikolsky's sign is seen in ?

Harrison's 16th Ed. 322

- A. Pemphigus vulgaris
- B. Toxic epidermal necrolysis
- C. Stevens-Johnson syndrome
- D. All of the above

1141 Fitzpatrick Classification is used for ?

Harrison's 16th Ed. 325

- A. Dermatomyositis
- B. Sunburn sensitivity
- C. Porphyria
- D. Polycythemia

1142 Which of the following is not a "metabolic photosensitivity disease" ?

Harrison's 16th Ed. 325

- A. Porphyria cutanea tarda - sporadic
- B. Erythropoietic porphyria
- C. Pellagra
- D. Carcinoid syndrome

1143 "Ash leaf spot" is the earliest cutaneous sign in ?

Harrison's 16th Ed. 300

- A. Tuberous sclerosis
- B. Dermatomyositis
- C. Pellagra
- D. Pemphigus vulgaris

1144 "Shagreen patches" refers to ?

Harrison's 16th Ed. 300

- A. Adenoma sebaceum
- B. Ungual and gingival fibromas
- C. Connective tissue nevi
- D. Fibrous plaques of the forehead

1145 Mee's lines - transverse white lines of fingernails is suggestive of which of the following ?

Harrison's 16th Ed. 2405

- A. Chronic mercury poisoning
- B. Aluminum poisoning
- C. Chronic arsenic intoxication
- D. Chronic lead poisoning

Chronic arsenic intoxication can produce confusion and memory loss associated with nausea, weight loss, peripheral neuropathy, pigmentation and scaling of the skin, and Mee's lines - transverse white lines of fingernails.

1146 Which of the following is associated with pes cavus ?

- A. CMT1x
- B. Friedreich's Ataxia
- C. Nemaline Myopathy
- D. All of the above

Pes cavus is associated with CMT1x, Friedreich's Ataxia, Nemaline Myopathy, Central Core Disease and Plantar Fasciitis.

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ANSWERS MISCELLANEOUS

1 C	26 B	51 C	76 B	101 B	126 C
2 D	27 A	52 B	77 B	102 C	127 D
3 D	28 C	53 A	78 C	103 A	128 C
4 A	29 A	54 B	79 B	104 A	129 A
5 B	30 D	55 A	80 C	105 B	130 D
6 C	31 D	56 A	81 A	106 A	131 D
7 D	32 B	57 A	82 B	107 C	132 C
8 D	33 A	58 A	83 A	108 D	133 A
9 A	34 A	59 A	84 D	109 C	134 D
10 B	35 A	60 A	85 C	110 D	135 C
11 A	36 A	61 A	86 D	111 B	136 C
12 C	37 B	62 A	87 C	112 D	137 A
13 C	38 C	63 A	88 A	113 A	138 A
14 D	39 D	64 D	89 B	114 B	139 D
15 A	40 B	65 A	90 A	115 A	140 A
16 B	41 B	66 D	91 A	116 D	141 B
17 C	42 A	67 D	92 B	117 C	142 C
18 D	43 A	68 B	93 C	118 B	143 D
19 A	44 D	69 B	94 C	119 C	144 A
20 B	45 B	70 B	95 C	120 A	145 B
21 A	46 A	71 B	96 C	121 D	146 A
22 C	47 D	72 C	97 C	122 C	147 A
23 A	48 D	73 C	98 C	123 B	148 C
24 A	49 A	74 A	99 C	124 C	149 C
25 C	50 D	75 B	100 D	125 A	150 D

ANSWERS MISCELLANEOUS

151 D	176 D	201 A	226 D	251 A	276 D
152 B	177 D	202 C	227 A	252 D	277 D
153 C	178 B	203 C	228 B	253 C	278 D
154 C	179 C	204 C	229 B	254 B	279 B
155 C	180 A	205 D	230 A	255 D	280 D
156 D	181 D	206 D	231 C	256 B	281 D
157 A	182 A	207 C	232 C	257 A	282 C
158 D	183 A	208 C	233 B	258 B	283 D
159 A	184 D	209 C	234 C	259 A	284 D
160 D	185 D	210 C	235 D	260 D	285 D
161 D	186 C	211 D	236 B	261 A	286 D
162 D	187 C	212 D	237 D	262 A	287 D
163 D	188 C	213 C	238 A	263 B	288 A
164 C	189 D	214 D	239 B	264 D	289 C
165 C	190 D	215 B	240 D	265 A	290 D
166 B	191 D	216 D	241 C	266 C	291 C
167 B	192 D	217 D	242 C	267 B	292 B
168 D	193 A	218 D	243 D	268 C	293 D
169 D	194 A	219 A	244 A	269 D	294 D
170 D	195 A	220 A	245 A	270 C	295 D
171 B	196 B	221 D	246 B	271 A	296 A
172 C	197 A	222 D	247 C	272 C	297 D
173 A	198 C	223 A	248 D	273 C	298 A
174 D	199 D	224 A	249 D	274 B	299 D
175 D	200 C	225 D	250 D	275 C	300 D

ANSWERS MISCELLANEOUS

301 C	326 B	351 D	376 D	401 D	426 A
302 D	327 D	352 D	377 A	402 C	427 D
303 D	328 D	353 D	378 D	403 C	428 A
304 D	329 D	354 B	379 D	404 C	429 D
305 A	330 D	355 C	380 A	405 C	430 B
306 D	331 C	356 D	381 D	406 D	431 B
307 C	332 C	357 B	382 C	407 D	432 D
308 D	333 D	358 D	383 A	408 C	433 D
309 C	334 D	359 D	384 B	409 C	434 D
310 C	335 D	360 D	385 A	410 D	435 C
311 D	336 B	361 A	386 A	411 B	436 C
312 B	337 D	362 C	387 A	412 A	437 B
313 A	338 D	363 D	388 B	413 B	438 D
314 B	339 D	364 B	389 B	414 D	439 C
315 C	340 B	365 B	390 A	415 A	440 C
316 C	341 D	366 D	391 A	416 C	441 B
317 D	342 A	367 D	392 D	417 D	442 D
318 D	343 A	368 C	393 D	418 C	443 A
319 C	344 B	369 D	394 D	419 C	444 D
320 A	345 B	370 A	395 D	420 B	445 B
321 D	346 C	371 C	396 A	421 D	446 D
322 D	347 D	372 C	397 D	422 A	447 D
323 A	348 D	373 C	398 B	423 D	448 D
324 C	349 D	374 C	399 B	424 A	449 C
325 C	350 D	375 D	400 A	425 B	450 D

ANSWERS MISCELLANEOUS

451 B	476 D	501 D	526 B	551 B	576 C
452 A	477 D	502 D	527 C	552 B	577 A
453 C	478 A	503 B	528 C	553 C	578 A
454 A	479 A	504 D	529 D	554 C	579 B
455 D	480 A	505 B	530 C	555 C	580 D
456 C	481 A	506 D	531 C	556 C	581 A
457 B	482 B	507 A	532 C	557 D	582 D
458 A	483 C	508 C	533 D	558 C	583 B
459 A	484 B	509 D	534 D	559 B	584 D
460 D	485 D	510 C	535 D	560 D	585 C
461 B	486 C	511 D	536 B	561 D	586 C
462 C	487 B	512 C	537 B	562 C	587 C
463 D	488 C	513 C	538 D	563 C	588 B
464 D	489 A	514 D	539 D	564 D	589 B
465 A	490 A	515 D	540 D	565 B	590 D
466 D	491 D	516 D	541 C	566 D	591 D
467 D	492 D	517 D	542 D	567 D	592 C
468 C	493 C	518 B	543 D	568 A	593 C
469 A	494 D	519 B	544 B	569 C	594 D
470 C	495 C	520 D	545 B	570 B	595 D
471 B	496 D	521 C	546 A	571 C	596 C
472 D	497 A	522 C	547 B	572 A	597 D
473 D	498 A	523 D	548 C	573 A	598 C
474 A	499 C	524 B	549 A	574 D	599 D
475 C	500 D	525 B	550 A	575 A	600 C

ANSWERS MISCELLANEOUS

601 C	626 D	651 D	676 A	701 C	726 B
602 C	627 A	652 A	677 D	702 D	727 C
603 D	628 D	653 A	678 C	703 C	728 A
604 C	629 B	654 D	679 A	704 D	729 D
605 D	630 B	655 B	680 D	705 D	730 D
606 B	631 A	656 A	681 D	706 A	731 B
607 D	632 B	657 A	682 D	707 D	732 B
608 C	633 C	658 C	683 D	708 B	733 D
609 D	634 C	659 D	684 D	709 D	734 D
610 C	635 C	660 D	685 C	710 C	735 A
611 C	636 C	661 D	686 D	711 D	736 C
612 A	637 A	662 B	687 B	712 D	737 A
613 D	638 A	663 B	688 D	713 C	738 D
614 C	639 D	664 D	689 B	714 D	739 B
615 D	640 B	665 A	690 C	715 B	740 C
616 D	641 D	666 B	691 D	716 C	741 D
617 D	642 D	667 B	692 D	717 B	742 B
618 D	643 D	668 D	693 C	718 B	743 A
619 B	644 C	669 D	694 C	719 B	744 C
620 B	645 B	670 C	695 C	720 D	745 D
621 B	646 C	671 A	696 C	721 C	746 D
622 C	647 C	672 A	697 D	722 D	747 C
623 D	648 D	673 A	698 D	723 D	748 D
624 D	649 D	674 B	699 D	724 D	749 A
625 D	650 D	675 C	700 C	725 B	750 D

ANSWERS MISCELLANEOUS

751 D	776 D	801 B	826 C	851 D	876 A
752 C	777 B	802 D	827 B	852 C	877 D
753 C	778 A	803 C	828 B	853 A	878 B
754 D	779 D	804 D	829 D	854 D	879 B
755 A	780 D	805 C	830 A	855 A	880 C
756 A	781 B	806 B	831 C	856 B	881 D
757 A	782 A	807 D	832 D	857 C	882 C
758 D	783 D	808 D	833 A	858 D	883 C
759 C	784 D	809 D	834 A	859 A	884 C
760 A	785 C	810 C	835 D	860 A	885 A
761 D	786 A	811 D	836 A	861 C	886 C
762 B	787 D	812 A	837 C	862 D	887 D
763 A	788 D	813 D	838 D	863 B	888 D
764 A	789 B	814 D	839 A	864 D	889 B
765 D	790 C	815 D	840 C	865 D	890 C
766 D	791 B	816 D	841 A	866 B	891 A
767 B	792 C	817 B	842 D	867 C	892 D
768 A	793 C	818 C	843 A	868 C	893 B
769 A	794 D	819 D	844 C	869 D	894 C
770 C	795 D	820 B	845 C	870 A	895 D
771 D	796 B	821 D	846 B	871 C	896 B
772 D	797 D	822 B	847 B	872 A	897 D
773 D	798 A	823 D	848 A	873 B	898 D
774 B	799 D	824 D	849 D	874 B	899 C
775 D	800 D	825 A	850 B	875 A	900 D

ANSWERS MISCELLANEOUS

901 C	926 D	951 D	976 D	1001 D	1026 D
902 C	927 C	952 A	977 A	1002 B	1027 A
903 B	928 C	953 D	978 C	1003 D	1028 D
904 A	929 D	954 D	979 D	1004 A	1029 C
905 A	930 D	955 A	980 C	1005 C	1030 D
906 A	931 D	956 A	981 A	1006 A	1031 D
907 D	932 A	957 D	982 B	1007 B	1032 D
908 D	933 C	958 D	983 D	1008 D	1033 D
909 C	934 B	959 A	984 D	1009 D	1034 D
910 C	935 A	960 D	985 B	1010 D	1035 D
911 A	936 D	961 C	986 B	1011 C	1036 D
912 A	937 D	962 D	987 A	1012 D	1037 C
913 D	938 C	963 B	988 D	1013 D	1038 D
914 B	939 A	964 C	989 D	1014 D	1039 C
915 A	940 B	965 D	990 D	1015 D	1040 C
916 A	941 D	966 D	991 B	1016 A	1041 D
917 D	942 C	967 B	992 C	1017 D	1042 D
918 C	943 D	968 A	993 A	1018 A	1043 B
919 A	944 A	969 C	994 D	1019 C	1044 C
920 A	945 C	970 B	995 D	1020 D	1045 B
921 C	946 D	971 D	996 B	1021 C	1046 A
922 D	947 B	972 D	997 C	1022 D	1047 C
923 C	948 A	973 D	998 C	1023 D	1048 B
924 B	949 B	974 D	999 D	1024 A	1049 C
925 C	950 D	975 B	1000 C	1025 D	1050 D

ANSWERS MISCELLANEOUS

1051 D	1076 C	1101 C	1126 A
1052 A	1077 D	1102 B	1127 D
1053 B	1078 B	1103 D	1128 C
1054 D	1079 B	1104 C	1129 D
1055 A	1080 A	1105 B	1130 D
1056 C	1081 C	1106 D	1131 D
1057 B	1082 A	1107 C	1132 D
1058 D	1083 D	1108 D	1133 D
1059 A	1084 D	1109 A	1134 D
1060 A	1085 C	1110 D	1135 D
1061 C	1086 D	1111 B	1136 A
1062 A	1087 B	1112 C	1137 C
1063 C	1088 A	1113 D	1138 A
1064 C	1089 A	1114 D	1139 A
1065 C	1090 C	1115 D	1140 D
1066 C	1091 B	1116 B	1141 B
1067 D	1092 B	1117 B	1142 B
1068 A	1093 A	1118 B	1143 A
1069 C	1094 B	1119 C	1144 C
1070 C	1095 D	1120 D	1145 C
1071 C	1096 D	1121 D	1146 D
1072 D	1097 C	1122 D	
1073 B	1098 D	1123 B	
1074 D	1099 D	1124 D	
1075 D	1100 D	1125 D	